251/1.9.10

VOLUME II, No. 1 NOVEMBER, 1959

EDUCATIONAL RESEARCH

A Review for Teachers and all concerned with Progress in Education

BUREAU OF EDNL. & PSYL. RESEARCH

Published for
THE NATIONAL FOUNDATION FOR EDUCATIONAL
RESEARCH IN ENGLAND AND WALES

by

NEWNES EDUCATIONAL PUBLISHING CO. LTD.
Tower House, Southampton Street, Strand, London, W.C.2

EDITORIAL

IN this issue of *Educational Research* we have made one slight departure from our declared formula of presenting the summarised results of research. The article by Dr. Dienes, which forms the third of the series on Arithmetic and Mathematics teaching is not, strictly speaking, a survey of a particular field. However, it seemed to us that the method he has developed, the material he has produced, and the experience already gained in its use represent a highly significant step forward in our thinking and practice in this subject, and that therefore no excuse is really necessary. Readers may find the first few pages somewhat difficult to follow—as, indeed, we did. The obscurity is not linguistic nor is it due to muddled or pretentious thinking (as is sometimes the case); the thought conveyed is in itself difficult but the attempt to master it is worth the pains since it is the key to what follows.

In this first issue of the academic year there is another small innovation. We publish an abstract from a thesis concerning a somewhat special group of handicapped children. In future issues and spread over the next few years, we hope to begin a series of articles, each one of which will be devoted to a broad category of pupils who need an education specially adapted to their needs. Papers will be devoted to the exceptionally gifted, to the backward and mentally subnormal as well as to those with mild or severe sensory or motor handicaps.

The topic of interests and their measurement is one of considerable importance to those who attempt to guide children between alternative courses at the secondary stage or who wish to help adolescents choose a career. As will be seen from the article on the subject, a great deal of work was done before the war and, sporadically, much has been done since, in this country, in continental Europe and in North America. In their article, Dr. Wiergesma and Mr. Barr try to bring some of it together in usable form. The article is of interest in another way since it represents a piece of practical collaboration between the N.F.E.R. and a Dutch organisation working in a similar field—and it shows how many common preoccupations there are in the two countries. We hope that future issues will continue to bear papers which result from international collaboration.

May we finally draw attention to the short article on Ability Grouping. This is a matter which, to judge by our correspondence, interests teachers from many points of view—in terms of the academic results of children taught in different kinds of class and terms of the educational effects of segregation. As with so many topics in education, opinions are the more hotly held in proportion to the absence of objective fact. Such firm knowledge as we have is set out in the article. The upshot is essentially negative, as it was concerning the size of classes. This, it must be emphasised is not due to a failure in research or to the absence of appropriate techniques. It is due to the smallness of the resources devoted to the study of the sciences of education. Objective information can be found; in conjunction with other activities, the N.F.E.R. will eventually get it: but unless finance and manpower are forthcoming, the time-lag will be considerable. We think that it is worthwhile, from time to time, to publish articles of this kind which expose the immense gaps in our knowledge of the most elementary matters; and we appreciate suggestions from our colleagues as to the topics which might be treated in a similar way.

Bureau of Edni. Research
Dated 1.9.70

THE TEACHER - PUPIL RELATIONSHIP

by K. M. Evans

(*Lecturer and Research Officer, Faculty of Education, University College, Cardiff*)

IN recent years there has been a shift of emphasis from the study of the individual to the study of groups and the behaviour and inter-relationships of the individuals who compose them. Techniques of observation and recording have been evolved and much interesting information has emerged concerning the structure of various types of group, leadership and isolation, and the effects of stresses and strains on group cohesion. The classroom group, being easily accessible and open to observation as some other groups are not, has come in for more than its fair share of study, and there is available a considerable amount of information both about teacher-pupil and pupil-pupil relations.

Teacher-pupil relations is a wide term, and studies of this relationship cover such topics as the influence of teachers on the immediate behaviour of their pupils and on their intellectual and social development, the contribution which teachers make to the mental health and adjustment of the children, the children's likes and dislikes with regard to their teachers, and the effects on the teachers of daily contact with their pupils. A small amount of the information available has resulted from definite observational studies of teachers and pupils in the classroom setting. More is to be found emerging incidentally from enquiries into other aspects of the teaching situation.

After its parents, a child's teacher is usually the most important and influential adult in its life, one who can exert an enormous influence on the child's character and mind. It has been suggested that where a child shows an educational difficulty, among the first things that should be investigated are the attitude of its teacher and the relationship between teacher and child. Education springs from the attitude of the teacher to his pupils, and the problem of the right attitude is central in teaching. The teacher must be able to include in his sphere of influence all types of children, the dull as well as the bright, the class hero and the outcast. At the same time the teacher must not regard the children as a means of satisfying his own desires and needs. They must be recognised as persons in their own right, so that the I-thou relationship is regarded as being of at least as much importance as the scholarship-intellectual relationship. The children have their part to play in their own education and must be seen as fellow-workers, not as so much material in the hand of the craftsman.

How much teachers can contribute to the adjustment of their pupils is shown in an account of an experiment in which twenty-three maladjusted children were left to the care of their teachers. The children were all of normal intelligence and achievement, so that they presented a psychological rather than an educational problem. Over a period of two years all except five improved considerably, the improvement being most marked in the case of the most intelligent children. The conclusion drawn is that, except in the case of children who are so severely maladjusted as to need specialist care, interested and sympathetic teachers can do much to ensure that their pupils achieve a satisfactory level of mental health. This calls for a depth of understanding which is part of the teacher's personality. It has been noted that social proficiency rather than intelligence is important here, and that the teacher who succeeds often does so because he or she provides what is lacking in the home. A deficiency in understanding on the part of the teacher may well have harmful effects. When a group of pupils who left school early were asked why they did so, the most common reasons given were discouragement and lack of interest, but ten per cent. mentioned specifically dislike of particular teachers who showed little sympathy with and understanding of their pupils.

At the same time, it must be remembered that teachers are human beings with needs of their own. Like other people, they need to be liked, and this sometimes leads insecure teachers to accept poor work and to try to impress their pupils with their knowledge. Teachers quickly form attitudes to their pupils and react favourably to those they find pleasing. The most successful teachers are usually secure and confident, they are interested in and like children, and are able to accept them. Sincerity is important here. Teachers may learn to disguise their feelings, but their pupils are usually aware of them. As one acute observer remarked, the personality of the teacher can best be studied by watching the reactions of the pupils.

The teacher's attitude of acceptance has been found to be closely related to his effectiveness as perceived by his pupils. The teacher who accepts himself and his environment as well as his pupils is likely to be effective in his work. It has been found that there is a strong tendency for teachers to prefer the pupils who are popular with other pupils, and to prefer least those who are least acceptable to their peers. This indicates that those characteristics of pupils which make for a poor pupil-pupil adjustment also tend to make for a poor teacher-pupil adjustment. At the same time there is evidence that teachers have, as a rule, little awareness of the true sociometric standing of their pupils. Where teachers have been asked to estimate the status of their pupils, the correlation between their estimates and the status as shown by a sociometric test has usually been low. Types of pupils who tend to be over-rated by their teachers include those who are outstanding in some way but unskilled in personal relationships, those who are courteous and responsive to their teachers but less pleasant to their fellow-pupils, and those who have desirable personality traits but are socially inhibited with their equals. Sometimes, too, teachers mistake for real liking the sympathy which children show to one of their number who is in some way handicapped. In one enquiry a crippled girl and a boy of another race, who appeared to their teachers to be very popular, were in fact found to be completely unchosen when the children indicated which companions they preferred for various activities. Pupils who can establish intimate relations with a few friends but who fail to respond in a large group, and those who antagonise the teacher but are liked by some of their equals tend to be under-rated by their teachers.

These findings, and also some which show that teachers are, on the whole, poor judges of the personality adjustment of their pupils, indicate that teachers are frequently unaware of the true basis of their reactions to their pupils. If the teacher-pupil relationship is to be therapeutic for those pupils who need this, the teachers must become consciously aware of the need. Otherwise it has been found that there is a strong tendency for them to overlook or misunderstand those pupils who most need their help. In view of the amount of good that can result for the pupils from contact with a teacher who is actively aware of their needs and desirous of helping them, there is a strong case for giving teachers all the available information about maladjusted pupils and for suggesting the kind of treatment which would improve their adjustment. Almost all teachers have the interests of their pupils at heart and they are strategically placed to do far more for them in this respect than most other people.

Turning now from studies of pupils as seen by their teachers, we come to studies of teachers as seen by their pupils. An early study of those teacher-characteristics which pupils liked was made by Kratz in 1896. Since then there has been a steady trickle of such studies. Some of these deal with the opinions of children, others with those of college students, while some ask for retrospective judgments on the part of adults of their school or college teachers.

It is not to be expected that such different types of study will produce closely similar results. People of different ages have different needs, and accordingly require different things of their teachers. There is, however, a remarkable agreement among children about the qualities they like and dislike in their teachers. They like teachers who are kind, friendly, cheerful, patient, helpful, fair, have a sense of humour, show an understanding of children's problems, allow plenty of pupil activity and at the same time maintain order. They dislike teachers who use sarcasm and ridicule, are domineering and have favourites and punish to secure discipline, fail to provide for the needs of individual pupils, and have disagreeable personal peculiarities. The unanimity of the findings of these studies is sufficient indication that there is no need for further studies of this type.

Pupils' opinions of their teachers have been found to be very little changed by the passage of time. The impression once made seems to last into maturity, but exceptions occur where contact has been maintained after leaving school. Where there is a difference of judgment between adults and children it is nearly always because adults, remembering their childhood teachers, tend to think in terms of qualities which are generally desirable in human beings, whereas the children tend to think specifically in terms of their qualities as teachers.

There is also evidence that pupils and administrators tend to agree in their assessment of teachers. Both rate highly teachers who enjoy their work and who have close and friendly relations with their pupils. Agreement is strongest, as might be expected, in the case of the most and least effective teachers and differences of judgment are likely to be greatest in the middle group.

Among college students again there is close agreement on what qualities are most to be desired in their teachers. More stress is placed among these older and abler pupils on the teachers' knowledge of their subject matter and on their ability to teach it well. Looking back on their school teachers, a group of students thought that they had been influenced by them in many ways, morally, intellectually and socially, and by personal kindness, interest, encouragement and sympathy. The influence of the teacher seems to reach a peak during adolescence, girls feeling it at a slightly earlier age than boys.

Quite distinct from the work already discussed are observations made in the classroom of the behaviour of teachers and of the response it calls out from the pupils.

A well-known study in this field was carried out by Lippitt and White. Four groups of five ten-year-old boys took part in what are described as " club activities " under different types of adult leadership, authoritarian, democratic, and laissez-faire. The authoritarian leader decided all the activities of the group himself, arranged the work of individuals, and remained aloof except when demonstrating. The democratic leader encouraged discussion of the task by the group, allowed a choice of methods and companions, and acted as far as possible as a member of the group without doing too much of the work himself. The laissez-faire leader left the group completely free; he provided materials but did not participate in any way unless asked for information. To eliminate the effect of the personalities of the leaders as far as possible, all groups worked for a period under each type of leadership and the leaders themselves changed their type of control when they moved from one group to another.

The reactions of the children to the different types of control were noted. Autocracy seemed to provoke two different types of reaction: submission, and aggression amounting to open rebellion. The democratic group was the most friendly and contented. The aggressive autocracy was the least contented. The laissez-faire group did least work. Pride in their work was most marked in the democratic group and least marked in the autocratic group. Since the groups were originally well-matched, these differences must be taken as caused by the treatments the groups received from their leaders.

In another set of studies made by a team of observers led by Anderson, two types of teacher behaviour were studied in ordinary classroom situations. These were described as dominative and integrative behaviour. Domination was " characterised by a rigidity or inflexibility of purpose, by an inability or unwillingness to admit the contribution of another's experience, desires, purposes or judgment in the determining of goals which concern others. In domination one attempts to make others behave according to one's own standards or purposes." Socially integrative behaviour, on the other hand, involved the pursuit of a common purpose and the reduction rather than the augmenting or inciting of conflict.

Although there were found to be differences in the proportions of these two kinds of behaviour displayed by different teachers, with most of them domination exceeded integration, particularly when the contacts were with groups of children rather than with individuals. The amount of domination increased during the afternoons and also as the term went on. Some children seemed to call forth more domination from their teachers than others, and boys did so more than girls. It was noted that children who tried to dominate others were in their turn met by domination from their teachers. Aggression was met by aggression and a vicious circle resulted.

Differences between their teachers were reflected in the children's behaviour. Those whose teachers were less dominative and more integrative were found to be superior in attention and co-operation and to show more spontaneity and initiative.

The question arose as to who initiated behaviour, the children or the teacher. The same children and the same teachers were studied again after an interval of a year, by which time the teachers had new classes and the children had new teachers. It was found that the behaviour of the teachers under the new conditions remained substantially the same, but that the original behaviour patterns of the children had given place to others which reflected the behaviour of their new teachers. There was little doubt in the minds of the investigators that the children's behaviour was a response to that of their teachers, and not vice versa.

This is supported by other observations of the same kind. In particular, it has been noted that tenseness in the teacher results in a tense class, whereas a relaxed and unhurried teacher has a calm class. Where the teacher is careful and painstaking the class shows the same characteristics. In some cases it has been found that where the weaker teachers were not getting the responses they wanted from the children, they were instead getting responses which coincided with their own actual behaviour. These findings might profitably be pondered by all teachers, for from time to time we are all puzzled by the apparent lack of co-operation which our best efforts call forth from our pupils.

Pupil-teacher relationships are the result of many influneces besides the actual personality qualities of teacher and pupil. The pupil's attitude to adults and to authority is conditioned by his home environment and by what happens to him outside school. The approach of both pupil and teacher may well be affected by what has happened to them in other classrooms or other schools. The subject matter of the lesson, too, plays its part. Given goodwill on both sides, a harmonious relationship will almost certainly result. Where the relationship is not harmonious, a teacher who sincerely desires the welfare of his pupils may easily be baffled to account for the pupils' attitudes. It is quite possible that the chief defects leading to a bad relationship may lie in the pupil, but the teacher who is concerned to improve the situation and has faith in himself and the children is in a strong position to effect an eventual improvement. The children are immature, and the teacher, whose maturity can give them a sense of security, is the person who determines the ultimate pattern of classroom relationships.

Bibliography

ANDERSON, H. H., *et al.*, *Studies of Teachers' Classroom Personalities, I, II, III.* Applied Psychology Monographs, Stanford University Press, 1945, 1945, 1946.

AUSUBEL, D. P., SCHIFF, H. M., and ZELENY, M. P., "Validity of teachers' ratings of adolescents' adjustment and aspirations." *J. Educ. Psychol.*, 1954, 45, 394-406.

BAXTER, B., *Teacher-Pupil Relationships.* New York: Macmillan Co., 1950.

BELL, S., "A study of the teacher's influence." *Ped. Sem.*, 1900, 7, 492-525.

BIRCHMORE, B., *A Study of the Relationships between Pupils and Teachers in certain classes in a Secondary Grammar School.* Unpublished M.A. Thesis, University of London Library, 1951.

BIRD, G. E., "Pupils' estimates of teachers." *J. Educ. Psychol.*, 1917, 8, 35-40.

BLUM, M. L., "An investigation of the relation existing between students' grades and their ratings of the instructor's ability to teach." *J. Educ. Psychol.*, 1936, 27, 217-221.

BOARDMAN, C. W., *Professional Tests as Measures of Teaching Efficiency in High School.* New York: Teachers College, Columbia University, 1928.

BONNEY, M. E., "Sociometric study of agreement between teacher judgments and student choices." *Sociometry*, 1947, 10, 133-146.

BOOK, W. F., "Why pupils drop out of high school." *Ped. Sem.*, 1904, 11, 204-232.

BOOK, W. F., "The high school teacher from the pupil's point of view." *Ped. Sem.*, 1905, 12, 239-288.

BOYCE, R. B., and BRYAN, R. C., "To what extent do pupils' opinions of teachers change in later years?" *J. Educ. Res.*, 1944, 37, 698-705.

BROOKOVER, W. B., "Person-person interaction between teachers and pupils and teaching effectiveness." *J. Educ. Res.*, 1940, 34, 272-287.

BROOKOVER, W. B., "The relation of social factors to teaching ability." *J. Exp. Educ.*, 1945, 13, 191-205.

BRYAN, R. C., *Pupil Rating of Secondary School Teachers.* New York: Teachers College, Columbia University, 1937.

BUSH, R. N., "A study of student-teacher relationships." *J. Educ. Res.*, 1942, 35, 645-656.

COGAN, M. L., "The behaviour of teachers and the productive behaviour of their pupils." *J. Educ. Psychol.*, 1958, 27, 89-124.

COLLIS, A. T., and POOLE, V. E., *These Our Children.* London: Gollancz, 1950.

DOLCH, E. W., "Pupils' judgments of their teachers." *Ped. Sem.*, 1920, 27, 195-199.

Drucker, A. J., and Remmers, H. H., "Do alumni and students differ in their attitudes toward instructors?" *J. Ed. Psychol.*, 1951, 42, 129-143.

English, O. S., and Pearson, G. H. J., *Emotional Problems of Living*. London: Allen and Unwin, 1947.

Figueroa, J. J., "Teaching and education: The teacher and the pupil." *Brit. J. Educ. Stud.*, 1955, 4, 24-31.

Fleming, C. M., *Teaching. A Psychological Analysis*. London: Methuen, 1958.

Flory, C. D., Alden, E., and Simmons, M., "Classroom teachers improve the personality adjustment of their pupils." *J. Educ. Res.*, 1944, 38, 1-8.

Gage, N. L., and Suci, G., "Social perceptions and teacher-pupil relationships." *J. Educ. Psychol.*, 1951, 42, 144-152.

Geyer, D. L., "Qualities desired in college instructors." *School and Society*, 1946, 63, 270-271.

Gronlund, N. E., "Relationships between the sociometric status of pupils and the teachers' preferences for or against having them in class." *Sociometry*, 1953, 16, 142-150.

Gronlund, N. E., "The general ability to judge sociometric status: Elementary student teachers' sociometric perceptions of classmates and pupils." *J. Educ. Psychol.*, 1956, 47, 147-157.

Haas, R. B., "A role study from pupil motivations: Students evaluate their English instructors." *Sociometry*, 1947, 10, 200-210.

Heilman, J. D., and Armentrout, W. D., "The rating of college teachers on ten traits by their students." *J. Educ. Psychol.*, 1936, 27, 197-216.

Hollis, A. W., *The Personal Relationship in Teaching*. Unpublished M.A. Thesis, University of Birmingham Library, 1935.

Jackson, V. D., "The measurement of social proficiency." *J. Exp. Educ.*, 1940, 8, 422-474.

Jersild, A. T., "Characteristics of teachers who are 'liked best' and 'disliked most'." *J. Exp. Educ.*, 1940, 9, 139-151.

Kratz, H. E., "Characteristics of the best teacher as recognized by children." *Ped. Sem.*, 1896, 3, 413-418.

Lippitt, R., and White, R. K., "The 'social climate' of children's groups." In Barker, R. G., Kounin, J. S., and Wright, H. F. (Ed.), *Child Behaviour and Development*. New York: McGraw-Hill, 1943.

Lippitt, R., and White, R. K., "An experimental study of leadership and group life." In Newcomb, T. M., and Hartley, E. L. (Ed.), *Readings in Social Psychology*. New York: Henry Holt, 1947.

Manske, A. J., *The Reflection of Teachers' Attitudes in the Attitudes of their Pupils*. New York: Teachers College, Columbia University, 1936.

Moreno, J. L., Jennings, H. H., and Stockton, R., "Sociometry in the classroom." *Sociometry*, 1943, 6, 425-428.

Myers, G. C., "The teacher's human frailties." *Ped. Sem.*, 1916, 23, 86-93.

Oeser, O. A. (Ed.), *Teacher, Pupil, and Task*. London: Tavistock, 1955.

Ojemann, R. H., and Wilkinson, F. R., "The effect on pupil growth of an increase in teacher's understanding of pupil behaviour." *J. Exp. Educ.*, 1939, 8, 143-147.

Porter, W. A., "Pupil evaluation of practice teaching." *J. Educ. Res.*, 1942, 35, 700-704.

Reed, H. J., "An investigation of the relationship between teaching effectiveness and the teacher's attitude of acceptance." *J. Exp. Educ.*, 1953, 21, 276-325.

Reymert, M. L., "The psychology of the teacher: An introductory study." *Ped. Sem.*, 1917, 24, 521-558.

Symonds, P. M., "Reflections on observations of teachers." *J. Educ. Res.*, 1950, 43, 688-696.

Tiedeman, S. C., "A study of pupil-teacher relationships." *J. Educ. Res.*, 1942, 35, 657-664.

University of London Institute of Education, *Studies in Education*. 7. *The Bearings of Recent Advances in Psychology on Educational Matters*. London: Evans, 1955.

Wall, W. D., *Education and Mental Health*. London: UNESCO/Harrap, 1955.

Withall, J., "The development of a technique for the measurement of a social emotional climate in classrooms." *J. Exp. Educ.*, 1949, 17, 347-361.

Withall, J., "An objective measure of a teacher's classroom interactions." *J. Educ. Psychol.*, 1956, 47, 203-212.

The Teaching of Mathematics—III.

THE GROWTH OF MATHEMATICAL CONCEPTS IN CHILDREN THROUGH EXPERIENCE

by Z. P. Dienes
Lecturer in Mathematics
in the University of Leicester

I. Introduction

THE purpose of this article is to show that there are ways in which mathematical concepts can be caused to develop in children so that the techniques they learn are preceded by an understanding of the corresponding mathematical structures.

There have been a number of attempts in recent years to do this, notably those of Cuisenaire and Stern. However, without minimising the importance of these initiatives, we hope to show that a great deal remains to be done, if insightful mathematics learning is to be achieved throughout children's mathematical careers. The full development of some of the more difficult concepts means that some experiences must be assimilated perhaps several years before the concepts are actually formed. It follows too that whereas a variety of experiences may be suitable for forming an early concept, only some of them will be fully suitable as preliminary experiences for later concepts. A full course of mathematical experiences, therefore, must be planned, both according to a carefully thought-out mathematical progression, and according to a definite theory of concept formation in children.

The mathematical progression chosen will, to some extent, depend on our theory of mathematics, as well as on how mathematical experiences can be dove-tailed to our theory. Here we may remark that it is perhaps not generally realised by teachers that different and opposing theories of mathematics are held by professional mathematicians themselves and that to such differences may well correspond differences in the ways in which children understand mathematics. We have, therefore, to allow for such differences in children and in mathematical theory so as to minimise their effect on learning. This means practically that the learning experiences we give should be varied enough to allow children to form their own concepts in their own way, instead, as we now tend to do, of trying to teach them in ours.

2. Aspects of thinking

Even to a casual observer it is clear that different people think differently. If they did not, there would never be any arguments and there would be no problems of communication and of understanding. We are not here particularly concerned with how these differences arise, whether they are innate or acquired, but only with the fact that they exist. Recent research by the writer has been able to throw some light on the nature of these differences (Dienes, 1959), but much remains to be done. We know, for example, that some people must formulate their concepts very explicitely and exactly before they can use them, while others can think in terms of the same concepts with equal efficiency but with only a small amount of such explicit formulation. Or again, some people, as Bartlett points out, tend to think of broad concepts in terms of the internal relationships of the constituent concepts, while yet others build up their concepts following some intuitively-realised requirement or standard. For the former it is more the detail and its intricacies, for the latter more the overall picture, that counts. These might be called the *analytical* and the *constructive* aspects respectively.

This distinction between analytical and constructive thinking is fundamental to the understanding of what follows. We may, therefore, here give some examples from ordinary mathematical thinking to show just what is implied. Take the statement:

$$\tfrac{1}{3} = \tfrac{2}{6}$$

This can be considered as expressing a relationship between the numbers 1, 3, 2 and 6, the relationship being embodied in the symbols used. It is the relationship of ratio. This is derived from a great number of such sets of numbers such as, e.g. 3, 4, 9, 12.

This would be the analytical aspect of the concept. But there is an entirely different way of looking at the relationship, namely, we can look at it as a build-up. In this case the relationship is not even seen, or only very dimly seen. In this conception the whole would be considered as consisting of six objects, which are seen as made up of three equal parts or thirds, and at the same time these thirds are seen to be made up of two objects. Mathematically, there is, of course, no difference between these two ways of conceptualising the statement $\frac{1}{3}=\frac{2}{6}$; but the personal emphasis can be on one side or on the other. Another example from an earlier stage would be the difference between " take the next number " and " add 1 to the number." The relationship of " nextness " is the analytical counterpart here of the constructive " add 1." In both cases, mathematically, we are dealing with obtaining $n + 1$ from n, but again the emphasis may be on the analytical or on the constructive side.

It would be possible to pursue this kind of analysis and to suggest other ways of thinking about similar or different mathematical statements. To prove their existence and interrelationships would involve a long and careful series of experiments. We are not, however, going to pursue this course here, but will restrict our considerations to the analytical and the constructive aspects. It is not suggested that these are the only forms of thinking invoked nor that they are mutually exclusive; however, they are important and we may assume that different people approach the same problem attaching varying weights to these different aspects.

Apart from differences of individual emphasis of the above kind, we must consider the possibility that there are ways which are objectively better or more efficient for acquiring a given concept—that is, that a weighting in favour of one aspect may be objectively better because of the inherent nature of the concepts in question. It has, in fact, been shown that certain concepts are just not amenable to learning by certain forms of mental organisation; objective methods are now being developed by means of which such regions of optimum emphasis may be determined. [Dienes, 1957.]

Consider now the problem of the teacher and the pupil. Each of these two will have his own region of emphasis, and these will have to overlap with the region of optimum emphasis as well as with each other if insightful learning is to take place (*see diagram, figure* 1).

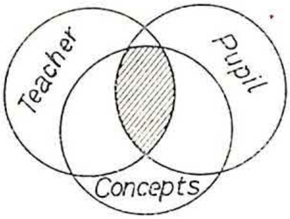


Fig 1

The boundaries to these regions will remain elastic if the teaching is varied and non-dogmatic, and an overlap can be secured more easily. If, however, we increase the number of pupils, it seems likely that we decrease the chances of a common overlap in all the regions. If there is no overlap between the regions of emphasis of the pupil and the teacher the pupil will not follow the teacher, since understanding is a mutual dove-tailing of the different aspects called into play. Without understanding, only rote learning can ensue—followed very often by dislike of the learning situation. This, alas, is what seems to happen in many mathematics lessons; the majority learn by rote and dislike the lesson. Our explanation would be that the required overlap can only be achieved in a few cases. These will become the pupils who are " good at mathematics." It also goes some way to explain why some children, who have made little or no progress with one teacher, will make a surprising leap forward when they come into the care of another.

If we accept the above explanation, it seems open to doubt whether what we have so far understood by " mathematical ability " is anything directly innate at all. Differences in mathematical attainment will therefore be explained by inherent (i.e. genetic) differences in general learning ability, and by whether the environment has or has not presented the child with mathematical experiences and teaching suitable to his way of conceptualisation. It follows from this that if we could make truly appropriate experiences available to a larger number of pupils, we should rear more mathematicians. The immediate task would, then, appear to be to increase mathematical insights in the classroom, but early enough to prevent the dislike which is the consequence of too many unsuccessful efforts at insight.

In planning the generation of such a succession of insights it is important to note that the constructive aspect of thinking develops much sooner than the analytic one. Children's early concepts are much more constructively than analytically directed. Piaget's famous examples on conservation of quantity (e.g. children under six or seven tend to think that if you scatter a group of objects more widely, there are more of them) suggest that the overall visual picture is, at this age, a much more powerful determinant of a concept than are the corresponding percepts of its analytical aspects. Notions of quantity at an early stage are linked with what a group of objects *looks* like, not with exactly how many objects there are in it. Piaget goes on to state that although children acquire, fairly early, reversible number concepts which are detached from sensory impressions, they are not really capable of abstract thought until the age of 11 or 12. Clearly, for abstract thinking we must here read analytical thinking. Piaget admits only analytical thinking as being abstract, and that is, no doubt, the consequence of his formalistic view of mathematics which bases it on logic. An intuitionist mathematician, i.e. one who regards the number series as fundamental and logic as secondary, would consider the overall type of thinking as being just as abstract, perhaps more so. As we shall see, the constructive aspects of many concepts can be developed long before the age of 11; these aspects pave the way for the later and fuller analytical understanding.

Let us illustrate the point by a further example. Take the multiplication concept. Take the two blocks illustrated below, one in each hand, and ask a six-year-old child: " The long one is how many times as big as the small one? "

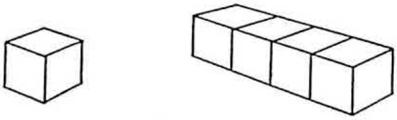


Fig 2.

A great many times the answer will be 3 not 4. This is because the child cannot yet appreciate the relationship 1 : 4 between the two objects (analytical thinking), but starts with the small object and mentally builds 3 more of them to make the long one (constructive thinking). Such a child needs a lot more practice in making the long piece with the little pieces. It is only through such practice that he can be led on to analytical thinking, constructive exercises having to precede the analytical insight. It may be that some children will never reach the analytical stage; the great challenge to the teacher is that of devising ways and means of making the whole of mathematics available to such children.

A further example is the concept of area. This concept involves multiplication (already quite difficult), as well as the concepts of linearity and superficiality. Children repeat the phrase " Length times width equals area," but they cannot see how inches are suddenly turned into square inches as though by magic, by a mere multiplication. Suddenly, the lengths have become an area, whereas just now they were just lengths. If one allows them to build a rectangle out of, say, 24 little squares, they will soon see that. for example, there are 6 rows of 4 or 4 rows of 6. It does not need many such exercises before they realise that the number of rows by the number in each row gives the total number of squares. This is the constructive aspect of area and usually if we stop at this point there is no trouble. What the non-analytical child cannot do is to identify the number of rows with the width, and the number in each row with the length, say. This insight may have to wait its turn, and will only occur when the child is ready for it. No amount of " explanation " will help. What seems to be reasonably probable is that it will never occur at all as an insight without the necessary experience and the child will repeat the formula like a parrot.

If we accept this analysis of the learning situation in a classroom as essentially a problem of creating a common overlap of " way of thinking," it is hard not to conclude that concepts cannot be taught at all successfully. The fact seems to be, that truly mathematical concepts are grasped only by a minority of children and this seems to bear out such a conclusion. However, it does not follow, of course, that concepts cannot be learnt, even though conventional teaching fails to ensure this. If research now in progress on the problem of finding the individual differences in thinking is fully successful, it may enable us to put children into groups homogeneous as to " thinking habit ' and thereby make effective teaching possible.

In the meantime, however, other methods must be found to enable insight to occur efficiently and more or less spontaneously by allowing children to work through many structured experiences. It is reasonable to hope that with carefully devised material providing a variety of experiences of different kinds we can create a situation in which children will abstract their own concepts in ways that suit them best. The overlap problem between teacher and pupil can thus be largely circumvented. We are then left with the problem of securing an overlap between pupil and concept structure. To cope with the latter is, of course, the essence of the learning problem. To understand the concept means just the dove-tailing of the individual emphasis of approach to the objectively optimum emphasis, and this is just what we mean by creating an overlap.

3. The dynamics of concept formation

It is time, therefore, to turn from the static picture of a concept to examine the dynamic problem of how such a concept arises. We shall borrow from Piaget's observations.

According to him there is a first, rather unconscious, " play " stage. In this stage, activity appears purposeless and undirected. Such is, for example the baby's first play with separate objects. He does not realise that he is laying the foundations of the concept of natural number, although his play is quite indispensable for the later acquisition of such a concept. In an entirely fluid and objectless world, it is hard to imagine that the concept of natural number could arise; concepts such as flow would be more fundamental. In the second stage it is vaguely realised that something needs to be attained, and a certain amount of direction begins to creep into the " play." In our example, objects are grouped into classes, compared, even " counted," although the number words at this stage are no more than tools with which to play a verbal game. The third stage begins with a rush of insight or realisation, the constituent parts of the concept suddenly click into place. A child might say: " Look, there are five here and there are five there! It's just the same!" This is usually followed by a great number of repetitions and a desire to " practice " the newly-found concept. Thus, the concept becomes part of the person, becomes truly operational, and is used for everyday categorising for ever more.

Let us look at this process more closely. In the first stage, behaviour has no apparent directionality. It seems haphazard, purposeless, and so appears playful. As this stage merges into the second stage, the amount of directionality increases, more purpose comes into the behaviour. A goal is being sought, without a realisation of what the goal is.

The existence of explicit labels, such as words and other symbols in current use, must also have a profound effect on the direction and acceleration of this stage. In other words the " culture " will influence this stage to a very large extent. We shall see that this is the stage which has the greatest educational opportunities as well as the most serious pitfalls. After sufficient information has been accumulated out of these experiences, this crystallizes into a form of organisation. This is what we call an insight. It may be a more or less explicit insight, a more or less constructive or a more or less analytical insight. As we have seen, there is reason to believe that individuals vary greatly in such structuring of their experience. Having achieved the insight, they will be ready to practise it, i.e. to find " feed-backs " into fresh experience. It is in this way that an insight, all new just now, soon becomes concrete enough to be used as an object of play and can start a new cycle. We shall call these the " Piaget cycles."

Some examples will make the matter clearer. Take the concept of *square*. Children from a very early age make patterns with like objects such as counters, pegs, etc. Such pattern building generally tends to be symmetrical and squares are bound to be constructed. This tendency is reinforced by the sight of an overwhelming number of squares and rectangles which abound in our culture. These activities would form the first stage. The child is quite unaware that his experiences will lead him to some as yet unconceived concept. These preliminary experiences are also partly preparatory to such concepts as *right angle*, *straight line*, etc., although these will need further and different first-stage experiences as well. Eventually, questions about shape, length and width, and possibly even about number of rows and number in each row (in the more analytically minded) will occur to children. They are at this stage becoming aware that there is something to discover about squares and some may even ask: what is it that makes a square a square? When this question is answered, if only implicitly, then the individual form of the child's concept of a square will have begun to take shape.

In the normal unhindered process of concept forming, no Piaget cycle begins until all its parts are ready as play objects from some previous cycle, so that the new cycle can be started. The moment " teaching " interferes with this natural process, there is a danger of attempting such cycles before the child is ready. All previous necessary cycles may not have been completed and the situation may not be mature for the next. To begin a cycle before the child is ready will probably lead to a failure to complete the cycle. Only the outward signs will be assimilated (e.g. formulae on the board), and so only rote learning will occur. The dynamic equilibrium of concept formation is delicate and easily upset by interference, emotional or intellectual; we hope to show, on the other hand, that if the teacher is aware of the stage through which the pupil is passing, he can considerably help the learning process. To do this he must provide appropriate experiences or hints, at times when these are beneficial and not harmful to the completion of the cycle in progress.

To help solve this problem, we propose to distinguish carefully three different types of experience. In this article we shall call these experiences games. They are as follows: (*a*) preliminary games; (*b*) structured games; (*c*) practice games.

A game is classified in relation to a certain concept. The same game can be a practice game for one concept and a preliminary game for another.

A preliminary game corresponds to Piaget's first stage. In relation to the concept in question it has little or no structure, it has the haphazard appearance of play.

A structured game has a certain directionality built into it. This directionality corresponds to the structure of the concepts whose formation it is intended to precede. If this direction is not picked up by the subject, he needs more preliminary games or games differently structured. If it is picked up, i.e. if he does what he is " meant " to do with the material, he will be working towards an insight. When the insight occurs, he is ready for the next stage.

The next stage is the one of practice games, whose role it is to help anchor the new insight firmly into the child's experience. These may also act as preliminary games for later concepts.

Let us again give some examples to make it clear what is meant by the three types of game. Consider the Theorem of Moments. In its simplest form this states that if two weights W and w are in equilibrium on a balance at distances a and b from the fulchrum, then

$$a \, x \, W = b \, x \, w$$

The immediate component concepts are: length, weight, equality, rotation, multiplication, apart from others on which these are based. Let us assume that all these concepts are already fully operational, i.e. that they can be used as play objects for starting a new cycle. This is clearly not yet enough for an insight into the Moment Theorem, even into the elementary form in which we have stated it. Experiences such as a form tipping up when you sit on one end of it, the efficient working of a see-saw, levering heavy objects, etc., are further necessary experiences. These would be, in this case, the preliminary games. Some of these games may be played before the other component concepts have been formed, and be spread over a period of years. Now games can be devised using a balance with hooks at equal intervals from the fulcrum on which metal rings can be hung. At first there will only be random play. The child will hang rings on the hooks producing inequalities, i.e. disequilibrium. Soon, however, the structure of the material will induce the child to ask certain questions, to which experience with the balance will provide the answers. Suggestions may accelerate this structuring, and eventually the conditions of equilibrium will be found. Thus, a structured game leads to the eventual insight. Now problems can be asked about the balance (e.g. how many rings on the second hook will balance 2 rings on the third hook?), which will act as practice games, but also as preliminary games to further concepts such as equations; more preliminary games involving finding a number should be followed by the intensification of the structuring in that direction, if this is the aim in view. This in turn will lead to further insights and the cycles will follow one another, much as in the natural case.

It cannot be over-emphasized that the games must be played at the times which are appropriate for each child, otherwise confusion and even boredom will arise. Some so-called " activity " methods have failed often because practice games have been used where preliminary or structured games would have been more appropriate. Examples of this, unfortunately, abound in our Infants Schools, as the reader will find no difficulty in seeing, if he agrees with the foregoing analysis.

In the natural concept formation process which goes on uninterruptedly all the time, artificially structured games are rarely played, and if they are, the structure itself is supposed to provide the amusement, as in a game of chess. Nevertheless, experiences have their own structures, and so some experiences will tend to lead towards a concept more quickly than others. The " play " quality of these early experiences is probably a powerful stimulus towards the attainment of concepts, and a careful selection of these play experiences could accelerate such growth considerably. Such selection is essentially the task of an Infants teacher. Unfortunately, these natural situations and games do not take us all the way. Although clearly as many of the games as possible should come from the children's real life situations, there comes a time when this is impossible. As higher and higher order concepts are aimed at, the number of life situations that could usefully lead up to them diminishes. Eventually, we are faced with having to teach children concepts for which they have absolutely no background of experience at all. What life situation is analogous to the complex arithmetical process of multiplying 27 by 45? The structure of the task is so special that no everyday experience corresponds to it. Clearly, if we still wish the child to form concepts as a result of experience, then we must provide him with artificial experiences to lead up to these more complex concepts and processes. In other words, there is a serious gap in a number of fundamental cycles, and it is the specifically educational task to fill in these gaps. It is taken for granted that experience must precede the concepts of Physics and of Chemistry. To drive home the relationship between pressure and boiling point, water is made to boil at low temperatures. Such experiences are essential for the understanding of the physical relationships involved. It is a curious fact that in the much more difficult case of mathematical relationships, such experience has not been regarded as necessary.

If, on the other hand, we are agreed on the necessity of providing such experiences to help mathematical learning, then we are faced with the task of constructing a series of pre-conceptual experiences which will fit into the children's natural concept formation cycles and will generate the required insights in at least the majority of cases. Since so very little has been done in this direction, there is very little to go by, except plausible hypotheses which may have a priori face validity. We shall now discuss a number of such hypotheses.

Hypothesis A. Visual, tactile and muscular images must be formed to create perceptual equivalents of a concept. From the common essence of these will be abstracted the conceptual structure.

This suggests that the more varied the perceptual models, the easier the acquisition of the concept. It is when we have had dealings with a variety of perceptual equivalents of a concept that we discover the purely conceptual structure by seeing that there is something in common to all the perceptual equivalents. It is thus that a really mathematical insight is achieved. A visual aid, or any other single " aid," although no doubt better than no aid, merely links the symbolism of mathematics to a visual equivalent. The " picture " of the concept is not the concept itself. The picture of 25 pegs arranged in 5 rows of 5 is no more the mathematical idea of " square " than is the symbol 5^2. It is the realisation of the common properties of a great many different such representations that constitutes the mathematical insight. We must pass from the percept to the concept, this being the process of abstraction.

Hypothesis B. The higher the level of generality at which a concept is formed, the wider its fields of possible applications.

We mean that the more we learn an idea as " that kind of thing " rather than " that thing," the wider will be the field in which we can apply it. In an experiment with rats, Bruner found that some of those rats that had learnt an alternating right-left maze, learnt an alternating black-white maze more quickly than others that had had no such experience. It seems that some of the first lot of rats had acquired at least an inkling of the more general concept of alternation, of which both left-right as well as black-white are particular cases. These rats applied this general concept to a wider field. The rats that did not make any transfer, learnt the left-right maze as left-right, and had no operational grasp of the " kind of thing " a left-right was.

Hypothesis C. A concept involving variables is best understood in its full generality if the variables contained in it are made to vary.

If we wish to teach the concept of a rectangle, we clearly cannot do it with a collection of congruent rectangles. We shall need to vary the sizes, shapes and positions of these, in order to convey the concept in its full generality. Thus, the concept will be deprived of all trimmings that do not form an essential part of it, and the general structure " rectangle " will be learnt.

Another example would be a moving object among some still ones. The eye will obviously alight on the moving object and follow it, in preference to the still ones. The hypothesis states that a conceptually moving object, i.e. a variable that is made to vary, is more readily followed in its generality, than a conceptually still object, i.e. a constant.

We shall see later on how apparatus can be devised in accordance with the above three hypotheses.

5. Classification of concepts

It is essential to have at least a rough classification of the concepts to be considered in terms of their mathematical content. We shall distinguish three types of concept:

(*a*) pure mathematical concepts,
(*b*) notational concepts,
(*c*) applied concepts.

The *pure mathematical concepts* are those that deal with number alone, or with relationships between numbers, and are independent of the ways in which we express numbers.

The *notational concepts* are those that deal with those properties of numbers that arise as a direct consequence of the ways in which we express numbers.

The *applied concepts* are those which express different facets of the real world as we find it by means of already formed mathematical concepts.

Pure concepts are, for example, the following: that 9 objects can always be arranged in as many rows as there are objects in a row, that there are some numbers for which this is possible and others for which it is not, that 12 can be regarded as 3 times 4 or 4 times 3. All these are quite independent of the notation used. We can write the corresponding numbers in our usual notation, in Roman numerals, or just by using dots on a sheet of paper and these properties would not be altered. They express properties of numbers as numbers and not properties of the way we express numbers.

Notational concepts are, for example, the following: that IX in Roman notation denotes I less than X, that XV denotes V more than X; that in 32 the first digit really means 3 tens, and the second 2 units; that when you add 27 to 38, having grouped the numbers in groups of 10 and whatever is left, you re-group the 15 into a group of 10 and 5 odd ones and join up all the groups of 10. The concepts mentioned are notational, because they would disappear if we changed the notation. There are, however, some pure concepts at the basis of the notational concepts mentioned. For example, the concept of grouping in certain size groups, and the concept of adding, are pure concepts. The concepts of grouping in tens with the accompanying convention of place value, of addition within our number system, are notational. Clearly, the pure concept must come before the notational concept, the latter being based on the former.

Applied concepts are, for example, the following: length, area, volume, weight, time, money-value, etc. When we speak of the length of a table, we consider one facet of the reality of the table as relevant, we purposely disregard all the others, such as its shape, height, colour, weight, etc. When we want to remove a table to another room, then facets such as the combinations of certain dimensions as well as weight, immediately become relevant. An applied concept is the consideration of one particular facet of reality while all others are temporarily ignored.

We cannot here discuss the full sequence of mathematical experiences which we might think should form the basis of our children's mathematical education. We shall take some examples of each of the above types of concept and show how, by using appropriate material, the necessary insights can be generated.

6. Pure concepts

In order to make clear what is meant by the development of a pure mathematical concept, some examples will be given, with suggestions as to the kind of material that might prove useful. The material now in use in a number of Junior Schools and in some Secondary Schools consists of a large number of inch squares, a smaller number of larger squares and rectangles, a number of strips an inch wide and $5\frac{1}{2}$in. or $7\frac{1}{2}$in. long; a large number of inch equilateral triangles, a smaller number of 2in., 3in., 4in., 5in. and 6in. triangles, all equilateral. There is also a pegboard with a large number of pegs, and a balance with hooks as already described on page 15, with metal rings. Children work with this material in pairs or singly if they prefer it. Each child has access to sufficient material to enable him to be handling it individually. No demonstrations are conducted by the teacher and the pupils work from a system of instruction cards. There are periodic diagnostic tests; records are kept of each child's concept attainment as he works through the cards; and revision cards are provided where needed. The reader should try to picture a class of 30 to 40 children, possibly actively engaged in as many different enquiries, guided by the cards and the supervising teacher.

Let us now consider an example and again take the mathematical concept of square. Children are asked to build larger squares out of a certain number of inch squares. They will note the numbers of smaller squares with which it is possible to do this, and others with which it is not. If it is not, they are encouraged to find how many more are required before they can complete the " next " square. Then follows the same problem on the pegboard, with pegs instead of squares. Then might follow the problem of making bigger triangles out of the inch triangles. They can be asked to make " diamonds " by putting two triangles together, and again find how many of these would make a bigger diamond. The same problem can be asked with the trapezium. If the children record their findings they will soon see that they always obtain the same numbers. These numbers have some sort of " magic " property, and it is the closer realization of this " magic " which is the process of abstraction leading eventually to the mathematical, not geometrical, idea of square.

The mathematical concept of square is an important connecting link between the measure of length and the measure of area. The games described certainly act as preliminary games to this link and as structured games to the more immediate concept of mathematical square. Hypothesis A is clearly being invoked, by giving the children many perceptual equivalents from which they will abstract the final concept. The variability of the sizes is in line with Hypothesis C as far as the immediate square concept is concerned; the variability of the shapes establishes experiences towards the final linkage of length and area in the much later similar figures theorem. It is impossible to test Hypothesis B, as we have really no other way of testing the generality of a concept except by the width of its applications by the subject. Therefore, this hypothesis is bound to remain a theoretical construct, and can only be tested in practice in conjunction with Hypothesis C.

The concept of square can be further evolved by leading on towards the relationship $(a + b)^2 = a^2 + 2ab + b^2$. This is probably best done at first by varying b and keeping a constant although a certain amount of variation of both is ultimately essential. The latter can be done by splitting say a 7 by 7 square of pegs into a 4 by 4, two 4 by 3 rectangles, and a 3 by 3, and repeating this with different size squares and with different splits. The former can be done by one square (say $5\frac{1}{2}$ by $5\frac{1}{2}$), any even number of $5\frac{1}{2}$in. strips and the necessary number of inch squares to complete the geometrical square. Here $2b$ is, of course, the number of strips, and b^2 the number of inch squares. According to Hypothesis A this is not enough, so we call in the pegs as a further equivalent, in this case keeping one square constant, which determines the length of the rows of pegs (again $2b$ rows will be necessary, each consisting of a pegs).

But probably the most powerful tool for detaching the growing concept from the geometrical square equivalent is to do the same task with triangles. The pupils should arrive at the conclusion that if we put a triangles along the side of a big triangle (see figure 3), then a^2 triangles will cover the big triangle. Such a set of triangles fitting a large triangle can be called a row. The length of a row depends on the size of the triangle chosen. It is now suggested that another row should be put on to the existing pieces. Almost invariably the " gaps " between the " spikes " are filled in, sometimes a hint is necessary to count the number of triangles in the second row. It is then clear that 1 triangle is missing from the " next " row. This is a highly structured game in the direction $(a + 1)^2 = a^2 + 2a + 1$. It is then tried with 4 rows, 6 rows, etc., and the number of triangles missing each time will, of course, be the magic numbers. Another step has been taken towards the formula for $(a + b)^2$.

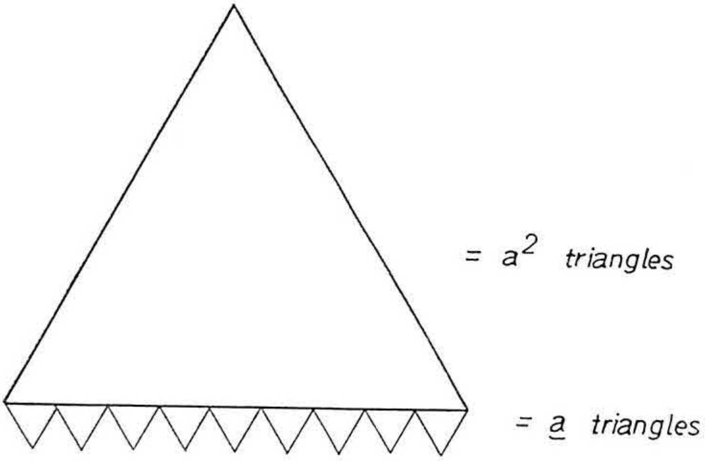


Fig 3.

It will be seen that nearly all the games are constructive. But when the situation is ripe, the game can be turned round into its analytical aspect and problems such as the following may be asked: given 49 inch triangles, make out of these (*i*) one large triangle, (*ii*) 6 rows, (*iii*) 9 odd inch triangles. How long must a row be? This is structuring the experience in the direction of quadratic equations. Of course, the same question can, and in most cases should, be asked about pegs and about squares.

It will be seen that quite high order concepts can in this way be made available to younger and less intelligent children than has been possible by conventional methods. The constructive leading will not harm the analytically-minded child, as he will automatically discard the apparatus as soon as he has analysed the structure of the task.

It is suggested that the pure concepts, leading naturally to algebraic relationships, should be encouraged to develop side by side with the arithmetical concepts. The latter would, of course, be chiefly the notational concepts involved in our system of writing numbers. The pure concepts are really necessary before the notational concepts are established. For example, in order to understand the process involved in multiplying 28 by 6, it must be appreciated that:

$$28 \text{ times } 6 = 20 \text{ times } 6 + 8 \text{ times } 6; \text{ OR}$$
$$6 \text{ times } 28 = 6 \text{ times } 20 + 6 \text{ times } 8.$$

These are particular cases of the two distributive laws, namely:

$$(a + b) \text{ times } c = a \text{ times } c + b \text{ times } c; \text{ OR}$$
$$c \text{ times } (a + b) = c \text{ times } a + c \text{ times } b.$$

The former is clearly a particular case of the latter, and by Hypothesis B, if the concept is learnt at a more general level, it will have wider applicability. It must not be thought that the two laws are identical. In the first case the operator is split, i.e. the number of times you take another number can be split; in the second case the operand is split, i.e. the number you are multiplying is split. The reader will perhaps work out as an exercise a structured game on the balance for the first form, and a structured game with pegs or squares for the second form.

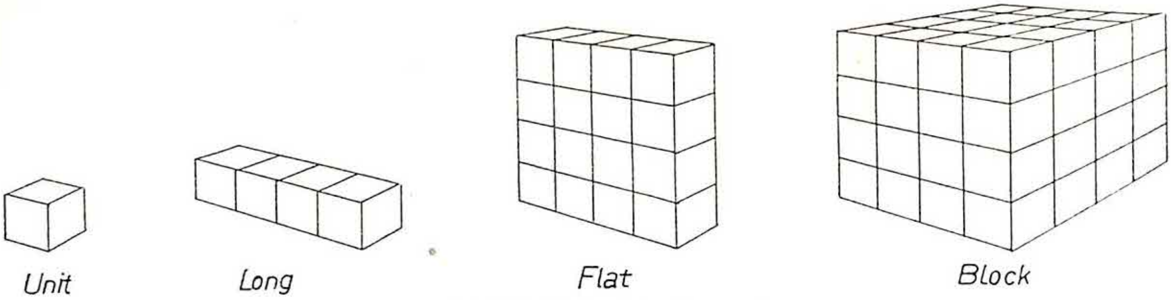
It is not necessarily intended that the pure concepts here alluded to should be formed in such a crystal clear explicit form as is indicated by the formal expressions of them in the above formulae. Children find it very difficult to be explicit; an implicit working knowledge derived from experience is probably enough as a basis for the understanding of the arithmetical process cited.

7. Notational and applied concepts

Here again we shall give some examples to illustrate how some of the rather difficult notational concepts can be made available to a larger number of children than hitherto, by means of structured games played with apparatus designed in keeping with the hypotheses A, B and C.

A piece of material, which will be referred to as the Multibase Arithmetic Blocks, or M.A.B., has been found very useful in accelerating the formation of notational concepts. The apparatus consists of pieces of wood, articulated on all faces into little unit squares, as shown on the diagram. It will be seen that the volumes of the pieces are in ascending

1·9·70
9251



Unit Long Flat Block

M.A.B. Material - Base 4

Fig 4.

geometrical progression, with common ratio 4. Other sets are included with common ratios 3, 5, 6 and 10. The pieces are referred to as: units, longs, flats and blocks, and there is a certain number of each of them in each set.

It will be clear that games with this material will be structured in the direction of the place value concept, a very difficult notational concept, but nevertheless one which lies at the basis of all arithmetical operations as now practised in our culture. In keeping with Hypothesis C the variables which go to make up this concept are made to vary. These variables are: (i) the base; (ii) the powers to which the bases are raised. The base is varied as the game moves from set to set, the power is varied by the simultaneous introduction of all the four shapes. It will also be noticed that the powerful dimension-aspect of perception is used to separate the different powers. Children brought up on these blocks should not confuse a^2 with $2a$, as a flat looks quite different from 2 longs, and if the linkage is once established, a quality difference between the powers will likewise be established. The different powers will acquire separate psychological existence.

The children first acquire the " feel " of the geometric progression. They make longs with units, flats with longs, blocks with flats, and they can even put blocks together and make a long block and so on. They then learn to exchange equivalent amounts of wood in different shapes, building a number of small pieces into a larger piece and splitting a larger piece into smaller pieces. In a more structured game they put blocks, flats, longs and units out in order, and if they are working to base n, they are told to go on exchanging until there are no more $n - 1$ pieces in any pile, except perhaps in the blocks' pile. It will be seen that this game leads children towards the concept of carrying in the addition and multiplication situations. The reader should not find it difficult now to devise structured games which prepare children for the concept of adding large numbers, including the possibility of carrying to the higher powers. Similarly, subtraction games can be devised, in which case the possibility of having to split large pieces into smaller ones must be prepared for. The games are usefully played on trays divided into three rows of four squares large enough to accommodate the piles, and marked B, F, L, U in the appropriate squares. This will be an additional aid towards the structuring of the game. These games are carried on to the base 10, when " difficult " subtractions, such as 1,000 — 356, are performed with thorough insight and satisfactory efficiency, in fact, the more difficult problems are more popular as there is more to do and so they are more interesting.

A natural follow-up to subtraction is division. This is easier than multiplication, as all the pieces are on the table, and all you have to do is share them out. Children greatly enjoy doing this and coping with the difficulties when there are not enough pieces to share out and they have to " change down " to smaller pieces. Formal division comes very naturally as the abstraction from such experiences.

The difficulty with multiplication is to get the children to understand that one of the numbers is an operator. Perhaps one should start with a number of doubling exercises, followed by trebling, and so on, but being careful not to use a multiplier greater than the base number. The pile to be doubled can be put in the first row, the doubling can be shown by putting two units on the *U* square in the second row, and the doubled amount of wood is then put in the third row, carefully arranged so that no pile contains more than $n - 1$ pieces.

Next would follow the discovery of the special properties of multiplying by the base number, which again is looked upon as somewhat magical by most children, particularly in the way they get the same numbers but larger pieces, and never any units. The " adding a nought " mystery is not a problem at all but a natural result of playing a structured game directed to generate that particular insight. The reader will now find no difficulty in seeing how a compound multiplication game can be devised. The children will, of course, need larger trays, although chalk marks on the desks will do just as well.

It may be objected that in the foregoing we have ignored Hypothesis A. It is quite easy, however, to provide alternative perceptual equivalents. Games with the abacus, worked again to different bases, can go hand-in-hand with the games described above. The abacus weans the child from the aid provided by dimension, but leaves the aid of the actual number of rings arranged in the right order on the rods. A further step towards the formalising of the process would be to use rings with numbers attached to them, and only put one ring on each rod. It is only a small step from here to the formal working of the processes on paper. It has been found that most children realise very quickly the " sameness " of the two tasks, i.e. the task with the blocks and the equivalent task with the abacus, and the abstraction process is completed without difficulty. The other intermediate stages are only required in a very small number of cases.

The usual objection to introducing a number of different bases is that it confuses the children. It is well to remember that what may be confusing to us, may not be confusing to the child. We are confused because we have thoroughly fixed the place value concept with a linkage to the base 10, and so we have to overcome a great deal of perseveration when working with other bases. Children who use this material presumably have not acquired the concept of place value and so there is nothing with which they could confuse it. The practical answer is, of course, that children are in fact not confused, the insightful learning of the notational concepts and the attendant techniques is very rapid by any standard.

Another important reason for using different bases is that it lays the foundations for the very general concept of variable. The manipulations in different bases are preliminary games for the later concepts of indices and logarithms. The essential component concepts of these are the base and the index, and the multibase blocks provide an opportunity for varying these variables. A child brought up on the Stern blocks* is far less ready for this degree of abstraction than one would be if brought up on the multibase blocks, if Hypothesis C is correct. It should be clear, too, that a child brought up on the Cuisenaire rods* would be likely to be even less ready for these later pure concepts than a Stern-trained child. Further concepts that would be influenced by the choice of M.A.B. would include the binomial theorem, linear factors of quadratics and cubics and many others. The variability of the base will in all these cases have been an essential preliminary to the understanding of the algebraic, i.e. general nature of these concepts. Here is an example where the choice of games for the development of early concepts can profoundly affect the acquisition of later concepts, these maturing perhaps years after the early ones.

We conclude this section with a few words on applied concepts. In the spirit of the foregoing, the applied concepts will also need to be acquired through experience. Here, however, real life situations are not lacking and the problem is easier both because children in any case come across experiences which help to generate in them concepts such as weight, capacity, money-value, etc., and because classroom experiences of this kind are easy to devise. Clearly, a child will learn the concept of weight by comparing weights of objects, weighing them against each other and against standard units. He will learn length by measurement of objects in terms of relative lengths, then in terms of standard units. As this is already being done in a great many schools, it is not necessary to dwell on it here.

8. Some higher order concepts

We shall now give a few examples of how the apparatus can be used to help generate higher order concepts, lest it be thought that this method is suitable only for young children. The foundation to all these attempts is, in short, to put the child in the same position as the researching mathematician, and so to open up for him the joys of really creative thinking. As we have seen, this cannot be achieved if violence is done to the natural concept formation cycles by leaving out entire stages or by forcing the child into a framework he does not understand.

Let us consider quadratic factors. After a certain amount of experience of suitable structured games, the child will associate a square with the symbol A^2, a strip with the symbol A, and the inch squares with the units. It is assumed that other perceptual material has been used as well, so that these associations are not unique, for example, a triangle will also have been associated to the symbol A^2 or X^2. Also the concept of area should by now be fully operational. A structured game for factorising

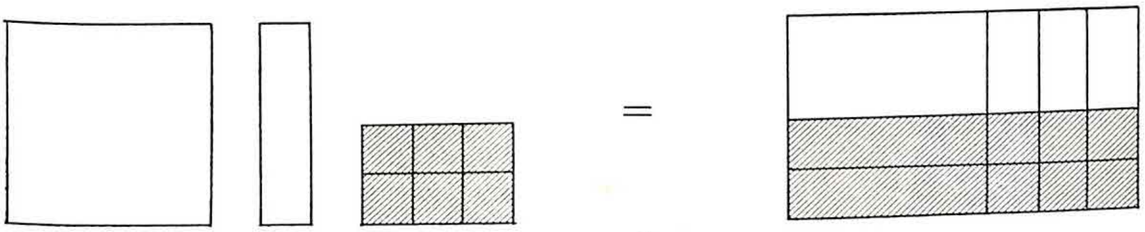
$$a^2 + 5a + 6$$

would be to provide a square, 5 strips and 6 inch squares and to tell the child to make a rectangle out of the pieces. This game can be repeated on the pegboard, varying the size of the square and so of the attached rows. This can be followed by giving them several squares and factorising such quadratics as $2a^2 + 5a + 2$.

---

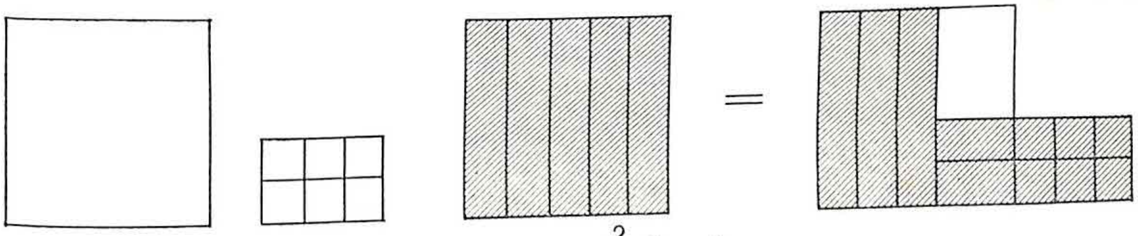
*A variation of the index is built into the Stern apparatus but not the variation of the base. Neither is built into the Cuisenaire apparatus.

But it is the negative terms which children find really fascinating. These are introduced by being given " covering pieces " as well as ordinary pieces, the former being used for covering up the latter. When an ordinary piece is covered up, it is considered detached, cut off. Suppose, then, that we wish to devise a structured game for factorising $a^2 + a - 6$. The child is given a square, a strip and six covering pieces, as shown on left of Figure 5, and is told to make a rectangle. The task is, of course, impossible without adding and subtracting and so it is only fair to tell the child that he can always take two more strips out of the box, as long as he uses one as ordinary, i.e. for extending, and the other for covering. This means in effect cutting a piece off and putting it somewhere else. The problem is solved as shown on the accompanying diagram, shaded areas representing covering pieces.



Factorising $a^2 + a - 6$
Fig 5

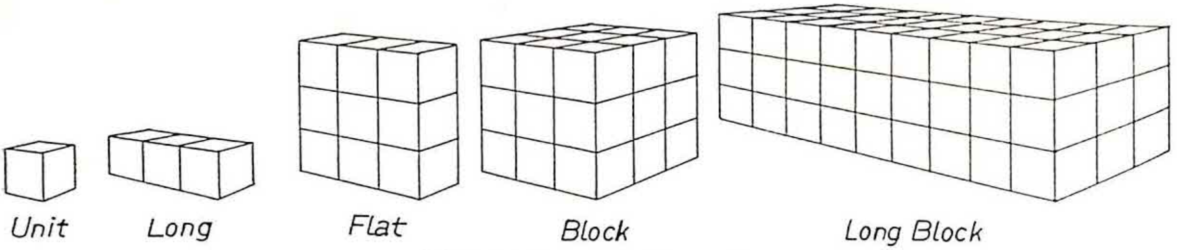
To factorise $a^2 - 5a + 6$, a child will naturally put the ordinary, i.e. positive pieces down first, and it is a short step from there to arranging the covering pieces so as to leave a rectangle showing.



Factorising $a^2 - 5a + 6$
Fig 6

This, again, is a good game towards the understanding of (-2) times (-3) being $+6$, if it is desired to start from $(a - 2)(a - 3)$, i.e. from building a rectangle whose lengths are $a - 2$ and $a - 3$. You cannot cover something up that is not there, so the six squares must be ordinary, not covering pieces.

We shall conclude this section with a few words about the law of indices and logarithms. With the M.A.B. the following hierarchy of shapes can be built.



M.A.B. Material - Base 3.
Fig 7.

taking the base 3 for convenience; when we reach the block, the next shape is 3 blocks put together, i.e. a longblock or *LB*, then next 9 blocks are put together to make a flatblock or *FB*, 27 blocks will make a blockblock or *BB*. There is no need to stop, except that we shall run out of wood from the boxes. On the other hand, a special series, consisting of pieces of unarticulated wood, can be constructed and carried much further, perhaps up to *BBB* or even further. If we denote the base by a, we shall have the following hierarchy:

U	*L*	*F*	*B*	*LB*	*FB*	*BB*	*LBB*	*FBB*	*BBB*	*LBBB*
1	a	a^2	a^3	a^4	a^5	a^6	a^7	a^8	a^9	a^{10}

It will soon be seen that multiplying by an L we move one step to the right and dividing by L we move one step to the left. Similarly, multiplying by F we move 2 steps to the right, and dividing by it 2 steps to the left. It is a small step from here to the law of indices. Blocks can now be constructed equivalent to combinations like a^2b^2ab where for example, a might be 3 and b 4. It will not be immediately clear that the structure can be rearranged into a cube. The analytically-minded might work out what sorts of shapes can be built with the material in $a^2b^2a\ b$, and find out that one of them must be a cube. The more constructive minded will build them all in turn and note them down. Either or both types of experience will enable the child to appreciate the beauty of the law of indices as an essence abstracted from such experiences. Some will regard it as a tidy set of relationships, others as different configurational possibilities. They are both mathematical insights, taken from different points of emphasis.

The concept of logarithm is now an extremely simple one to which to proceed. The numbers that figure under the shapes of the hierarchy are the logarithms of these shapes. For example, log. $LB = 4$, log. $BB = 6$, and so on. Having realised that F times $B = FB$ it does not take long to conclude that:

$$\log. F + \log. B = 2 + 3 = 5 = \log. FB = \log. (F \times B)$$

and the log. theorems appear as just another way of saying the laws of indices, which is, of course, just what they are. If the shapes are given numerically in the terms of the number of units they contain, then it must be specified which box they have been taken from. For example:

$$\underset{\text{box } 3}{\text{log.}} \; 81 = 4, \qquad \underset{\text{box } 4}{\text{log.}} \; 64 = 3$$

and so on. The conventional notation is reached as a necessity as otherwise the shape cannot be identified.

To finish the story, what could be more natural than to call $L\ a^1$ and $1\ a^0$, to complete the hierarchy. The geometrical progression can now be continued to the left, by dividing the units into 3 thirds of a unit, which look like a tiny version of a flat, this in turn can be divided into three parts, each part then will look like a tiny long and so on. It is very natural to call these -1, and -2 powers, which then become the logs of the tiny pieces. With some practice on the conservation of the law of indices for these powers and logs., the enlarged concept will be safely anchored. To carry on to fractional indices and so to a richer harvest of logarithms, it is best to shift the notation, and call $BBBB = a$, for example. In other words, now log. $BBBB = 1$ whereas before it was 12. To be in keeping with what has gone before what could be more natural than to call $BB = a^{1/2}$ and $B = a^{1/4}$ and, for example, since LB x LB x $LB = BBBB$, $LB = a^{1/3}$, and so on. The shapes now acquire fractional logarithms equal to these fractional powers. An overall insight into fractional, positive and negative indices cannot be long delayed, if structured games along the lines indicated are played.

It should be added that the possibility of entirely abstract games should not be lost sight of. At what stage the average child would mature to be able to enjoy abstract games without any tangible material is not as yet known, since these games have not been made available to the average child up to the present. Only the very few are able at the moment to break through the morass of formalism to the beauty of the structure beyond, and those who finally decide to play with this structure are the ones who become mathematicians. Far too long has mathematics been the preserve of the few, and a kind of mathematical aristocracy has grown up that in a sense tries unconsciously to perpetuate itself by making mathematics too difficult for the many. It is time that the gates of this preserve were thrown open to all, so that yet one more creative activity could be opened up for the ordinary citizen with which to enrich his life.

9. Conclusions

It is not as yet possible to draw any hard and fast conclusions as to the practical working of the scheme under actual school conditions and so to give the full vindication of the theory here presented. It is, however, possible to state some qualitative results derived from trials in a number of schools. Schemes of individual mathematical discovery can be worked in large unstreamed classes throughout Junior Schools; a large majority of normal children can understand the complex workings of the four rules of arithmetic in the decimal and other systems; normal 10-year-old children can learn the use of brackets, the properties of squares, the solution of linear and quadratic equations and the factorising of quadratic functions, if approached from the constructive point of view. In fact, it is possible to give children leaving Junior School a solid body of practical experiences, impossible to obtain from real life situations, on which a very extensive Secondary School curriculum can be based. There are almost limitless possibilities for enlarging the Junior School syllabus, by including such topics as theory of groups, usually reserved for University Honours courses.

There is, even now, sufficient evidence to suggest that mathematics can be introduced to a larger section of the child population than has hitherto been thought practicable or possible. This is done by co-ordinating the teacher's work with the natural process of concept formation in the child. It is a challenge to the teaching profession to devise ways in which this much larger body of children can be drawn into the mathematical workshop. By doing so, a large potential of future mathematicians, scientists and technicians would be created, whose practical bias is likely to make them extremely useful members of our increasingly technological Society.

Editorial Note

The two sets of material referred to in this paper and the instructional manuals which go with them are in course of production and can be ordered only from the N.F.E.R. through L.E.A.s. Their supply is subject to conditions regarding their use, including, in the case of the A.E.M., restriction to teachers who have undergone courses of training, details of which may be obtained from the Deputy Directors of the Institutes of Education in the Universities of Leeds and Leicester.

Bibliography

BARTLETT, F., *Thinking*. London: Allen and Unwin, 1958.

BRUNER, J., " On Transfer of Training."

DIENES, Z. P., *Concept Formation and Personality*. Leicester: 1959.

DIENES, Z. P., " Sulla percezzione astratta," *Rivista di Filosofia*, 1957.

PIAGET, J., *The Child's Conception of Number*. London: Routledge and Kegan Paul, 1952.

Teaching Children to Read—III

READINESS TO READ

by E. J. Standish

Introduction

THE age at which children start their schooling differs from country to country. In the United States it is permissive at five but not compulsory until six, while in the Scandinavian countries it is postponed until seven or even eight. In Britain children are required to begin at five. In fact, one in a hundred of the children commencing school at this age will have already become familiar with school life, having attended a nursery school or class. This comparatively early beginning of schooling tends to create many problems and difficulties for the admission or reception class teachers in our schools which are specific to our educational system.

The interaction of maturational and environmental factors produces different rates of development in children, so that even though all the children beginning school come from a particular age group, they will evidence a wide range of mental development, and will react in varying ways to the demands made upon them by this new experience. Some children will adapt quickly and easily, whilst others may experience considerable difficulties. The act of starting school for the first time presents children of this age with different and sometimes unexpected events and patterns of behaviour, such as the daily temporary separation from the comparative shelter of the home and entry into the bustle and activity of the classroom. The individual school and its teachers demand specific achievements from the child, such as the ability to dress himself or to practice common courtesies. The ease with which a child settles down during his first term at school depends upon the interrelationship of the needs of the individual pupil and the demands made by the particular school.

When we consider the teaching of reading at the infant level, we need to remember that the child's acquisition of this complex skill depends upon a great many aspects of his development. There are first such obvious things as his general readiness to adapt to school and the ways of learning, his chronological age (five or " rising five "), his mental age, his stage of language development, the state of his vision and hearing, and even possibly such factors as his eye-hand dominance. Equally critical however may prove to be the possession of those specific abilities that are relevant to the exercise of reading skill, such as the understanding of the relationship of symbols and their meanings, the ability to make visual and auditory discriminations, the comprehension of space orientation, familiarity with a left-to-right approach, and a certain degree of eye-hand and motor co-ordination.

The biographical and longitudinal studies of children made in the past fifty years have provided us with considerable information about early development and the type of behaviour to be expected at different ages. Such " behaviour profiles " or age-group pictures are undoubtedly useful; they help the teacher, for example, to recognise certain types of behaviour as transitory, normal or abnormal. But they can be little more than suggestive for a particular teacher faced with a particular class. In many cases the samples studied were small and not representative of children in general; in a considerable number the observations are based upon samples of children of above average intelligence, usually from superior socio-economic backgrounds. Also, as Valentine (1948) suggests, " one is often left in doubt as to whether a particular form of behaviour is common at the age, or reported because of its inherent interest." It is possible that the behaviour profile of a particular age group may produce unrealistic expectations on the part of the teacher, which can hinder both the pupils' progress and the teachers' success in meeting their needs.

For instance, Gesell, in his study of American children, *The Child From Five to Ten* (1946), although noting that his observations are only indications of the kind of behaviour which tends to occur at a given age and should not be taken as norms of behaviour, proceeds to report in some detail that the five-year-old likes to be read to and spends considerable time looking at books pretending to read. He continues that by six, children may be reading from memory, are taking more active parts in reading, and recognise single words. He also mentions regular periods of parental reading to the child, such as at bedtime or while the child is having his bath. Since the American culture has sanctioned the sixth and seventh years for beginning school, Gesell's six-year-old profile is largely concerned with school adaptation, whereas this important transition occurs much earlier for the English child. His descriptions of the six and seven-year-olds' reading habits and behaviour are interesting, especially for comparative purposes but a recent study carried out by the N.F.E.R. in sixty primary schools in Kent (Morris) probably is of more practical value to the teacher in this country, since it describes the situation which daily confronts the teacher of beginners and describes the extent of her task.

The Task of the Teacher of Beginners

One of the most interesting findings of this study was the extent to which the needs of the newcomers differ from school to school. Of the sixty schools, fifty-five were introducing reading to most of the children for the first time, but in the other five most of the children had already been introduced to reading by their parents, were familiar with books, and had mastered the mechanics of reading.

This suggests that the task of the reception class teacher must vary according to the nature of the pupils' home background. Some will be beginners in reading, whereas others will have already made considerable headway, resembling the children of Gesell's observations. Both types of children will probably require completely different methods and experiences in the teaching of reading and the range of their needs may well tax both the skill and the patience of their teachers.

As we have seen, some teachers will find that part of their work has already been carried out in the home. Undoubtedly, the child from the poor socio-economic area or the uninterested home will present a greater teaching problem in terms of the extent of the task, but the teacher who is presenting reading to pupils already familiar with the skill will have a different but equally difficult challenge. For instance, the Kent study showed that the children who had been encouraged to read at home were often being set a far higher level of attainment and in consequence there was greater emphasis on competition and on success or failure. Parental interest exerted pressure which influenced school aims and even made it difficult for head teachers to change their approach, especially if this should be in the direction of a less formal organisation or procedure with a consequent lessening of competitiveness. The interest of the home in the child's progress and the desire to purchase the reading series used in the school for home practice, often made difficulties for the teacher particularly in the provision of fresh, unfamiliar reading material for school use.

Teachers who are mainly concerned with the problem of perfecting and exercising a skill already acquired at a rudimentary level, probably find that one of their greatest difficultues is to enable each child to set himself a realistic level of aspiration, neither too far below nor too far above his level of ability. At the same time they have to maintain his active interest in the subject.

Teachers who are faced with the task of introducing reading to their pupils for the first time have a different set of problems. If the parents are uninterested or unable to provide the appropriate pre-reading experiences before the child comes to school at five, then the teacher must create these experiences, and provide an environment in which these children can find an interest in reading and an understanding of its importance. It seems likely, however, that the value attached to the attainment of this highly complex skill is predominantly a middle class one, and that the motivation to read is less prominent in poorer socio-economic areas. Children from homes in such areas are less likely to want to learn to read—their lack of interest being an expression of their culture, of values approved by parents and siblings, and instilled from birth. It need not be solely through lack of parental interest in the child's progress but rather because the patterns and habits of home life simply do not provide the opportunities likely to be valuable as pre-reading experiences. For example, the bed and bath-time reading sessions by parents reported by Gesell are likely to be confined to the homes of good or high socio-economic status with relatively few children, where parents are able to spend time with their children. Inglis, in his review of recent investigations [*Studies in Reading* (1948)], points out that " the literature on the subject of the relation between reading and the social environment is scanty, and much remains to be done to show what is the amount and what are the effects that follow from being in an environment impoverished in experience, idea and word."

Some of the Kent teachers were faced with the problem of teaching children who came from homes where there was little value attached to the skill of reading. These teachers had to cope with the low general ability of the children, a lack of parental help and encouragement, and in some cases with the added problem of the illiteracy of the parents themselves. In these schools, a high proportion of the newcomers were unable to read, showed inadequate language development and sometimes were even unable to talk intelligently, giving at first the impression of being dull. It is heartening to note that usually by the end of the first school year, the encouragement of the teacher had enabled them to express themselves with a tolerable degree of fluency. The task of the teacher of such children seems to be that of sustaining the initial eagerness to learn which is so often demonstrated during the first few weeks of beginning school when everything is exciting and an adventure into a new and different world, while providing those experiences and the training necessary for the development of skills basic to the reading process.

The close relationship between reading and home background is not a recent discovery, but the Kent study does enable one to realise that different kinds of education may be needed in infant schools in different areas.* This is probably possible where the social background is homogenous but becomes much more difficult where the school draws its pupils from widely differing social backgrounds.

Ascertaining Stages of Reading Development

Children who can already read on going to school are probably best helped by a teacher who uses a reading attainment test to distinguish between those who, already competent readers, should be encouraged to choose more difficult material, progressing at their own rate, and those less advanced who need further guidance, instruction and practice at a more elementary level.

The problem for the teacher whose children cannot read on entry is to discover how ready they are to learn and what experiences or training they still need. The notion of readiness comes from the field of child study, and carries the suggestion that there is an optimum time for any particular learning task. It is similar to Havighurst's (1953) " teachable moment " which is described as the moment when, because conditions are most favourable for the training task, efforts at teaching, largely wasted had they come earlier, give gratifying results.

In the case of reading, it is likely that the moment of readiness depends for the individual child on: (*a*) his general level of learning ability or intelligence, (*b*) the adequacy of his sensory equipment and the stage of development of his perception, including the capacity for visual and auditory discrimination, (*c*) his language development, (*d*) his background experiences, and (*e*) the strength of his interest in learning to read. Clearly, reading readiness involves a number of complex and interacting abilities and skills. It is possible there may be a tendency to compensate in some other direction than that in which there is a marked deprivation or deficiency, but it is likely that there is a minimum level which has to be reached in all directions before the child is ready to learn to read and can benefit from formal instruction. However, we should remember too, that development in one direction may markedly affect growth in another: for example, the relationship between language and intelligence. As yet we know relatively little about such threshold requirements or the possible combinations of stages of development in the growth of the various abilities and skills.

The idea of reading readiness then, is that there is a " teachable moment " when the efforts of child and teacher are likely to produce the best results and not prove ineffectual, The difficulty for the teacher is to discover this, and not to leave a child who is ready, to become bored and uninterested, nor to introduce a child to the skill who cannot as yet cope with the demands so made upon him. Many teachers do this more or less effectively by developing their own powers of observation, and, through experience, become capable of recognising the evidence of such readiness in their pupils.

---

*The N.F.E.R. are proposing in the near future to carry out a study of the problems of teaching children from areas where the home provides little encouragement, so as to ascertain the most effective methods of teaching reading where it is predominantly the teacher's responsibility.

Tests of Reading Readiness

It would obviously be an advantage to many teachers if there were some objective way to supplement and refine these unaided observations, especially when time does not allow prolonged trial and error. Researchers have attempted to devise tests to measure this composite factor of reading readiness and generally such tests consist of a number of sub-tests of the paper and pencil kind. Most of the tests are intended for group administration but a few include sub-tests for individual use only.

Such reading readiness tests vary in many important respects although they all have some features in common. Of the eight batteries described later in this issue, all use a test of visual discrimination; six use tests of vocabulary; three use motor tests; two, tests involving the following of directions; two tests of the reproduction of patterns and shapes from memory; and two make use of tests of relationships.

Since the definition of words and the naming of objects are used as items in a number of widely-used intelligence tests, it is possible that both the reading readiness test and the intelligence test overlap to some extent. Some attention has been given to the relationship between tests of intelligence and tests of reading readiness and in the Scottish *Studies in Reading* (1948) Inglis reports that " the general conclusion is that mental age is slightly inferior to reading-readiness measures in predicting reading attainment," while Robertson and Hall (1942) note that a combination of the two does not notably increase predictive value. Indeed, Robertson and Hall have argued that existing reading readiness tests measure primarily the same thing as existing tests of intelligence. As yet there seems to have been no detailed examination of the content of reading readiness and intelligence tests to discover the extent of their differences and similarities in the type of items used.

It has long been held that, apart from tests of intelligence, the tests that measure the factors most frequently involved in reading readiness are those concerned with the perception of visual material; and, of these, the type of sub-test that correlates most highly with reading attainment in the early stages appears to be word perception rather than tests using geometric forms. It would then appear that the most effective type of reading readiness test is, in fact, a test of reading achievement. Witty and Kopel (1939) put forward this view, stating that " the best index of readiness is the child's actual ability to read letters and words in meaningful units and sequences." This may be true of American children who are a year later in starting school and may have developed an interest in words and letters in their fifth year, but we do not know whether children in this country do show such a preliminary knowledge of reading elements which would be predictive of later reading performance. Indeed, Inglis suggests that " investigations are required in the field of reading readiness in Scotland and England. An interesting starting-point would be to apply some of the American tests of word discrimination in order to discover if a sufficient degree of readiness for dealing with print existed at age five, and to what extent it differed from the readiness shown in these tests by American children at age six."

J. B. Stroud (1945) suggests that " low correlations between perception of designs and perception of words, letters, and digits may be due to differential practice, not to differences in innate capacities involved," and puts forward the view that there is a general factor of visual perception in achievement in reading. A recent study by Goins

(1958) has shown that there seem to be two factors not one involved. This study found that visual perceptual tests without any reading or verbal content could produce substantial correlations with reading test scores of first grade pupils on tests administered towards the end of their first school year. The results of a factor analysis carried out in the course of this research revealed that a relatively subtle type of perceptual closure is more closely related to reading achievement at the beginning level than is the skill measured by the perceptual-speed type of sub-test usually used in measures of reading readiness. The use of verbal material in reading readiness tests may distort correlations with reading skill, and it would seem from the evidence of this study that visual perception may be as important in the learning to read stage as familiarity with print. This would suggest that current reading readiness tests would need to be revised since the tests of visual discrimination they use are predominantly measures of the ability to perceive and to keep in mind a perceptual whole, whereas this study shows that visual perceptual ability also involves strength of closure, that is the ability to keep in mind a configuration against a distraction. Goins found that tests which measured strength of closure had a substantial common variance with reading achievement at the first-grade level and that several of these tests were better predictors of reading success in the first grade than were the two standard intelligence tests used with the children. Readiness tests which used these types of sub-test could be used to differentiate early and easily the type of pupils who are likely to benefit from modern reading methods which emphasise reading by " wholes " from those who are likely to need different instruction.

The Use of Reading Readiness Tests for Diagnostic Purposes

The concept of readiness is increasingly being revealed as a complex structure and the principles behind the construction of tests to measure it are changing as time and research reveal the limitations and possibilities of both the concept and its measures. The method of assessing the predictive value of reading readiness tests most often used has been to accept later reading achievement as the criterion of correct forecast. Robertson and Hall analysed the data published up to 1941, and found that the median correlation between reading readiness tests and measures of reading success was .58, while the median correlation of teachers' ratings (on rating scales) and measures of reading success was .62. Neither of these is very high nor would they lead us to place great confidence in the estimate concerning any individual child. It is evidence such as this which may have caused the designers of reading readiness tests to re-examine their ideas about the scope and function of such tests. Most of the authors have put forward their results as tentative conclusions because of the obviously complex nature of reading readiness and the subsequent inability of test measures to account for all its facets. Witty and Kopel (1939) made the comment that " only when the total readiness test score is very high or very low does it (the reading readiness test) assure with any certainty the presence or absence of readiness. Readiness devices are somewhat helpful, however, in that their sub-tests provide evidence concerning the relative development of several fairly specific abilities related to reading achievement." It is this type of observation which may have led the authors of the new type of reading readiness tests to design them as measures of the specific skills required in the composite skill of reading. The items are designed to discriminate between those children possessing the contributory skill and those who are deficient in it, and items are selected on the basis of their ability to do this. The authors of such tests are more concerned with " built-in " validity than with validity of prediction. They expect their tests to provide the data for a profile of the stage of development of the abilities the child brings to the reading situation rather than to give a total score which may be misleading in its generality. Such tests are useful guides to the teacher because they are diagnostic rather than predictive: they ascertain individual strengths and weaknesses rather than predict possible but not inevitable levels of achievement.

It is this changing concept of the function of reading readiness tests which possibly has given rise to the confusion over whether such tests can be strictly described as achievement tests. The earlier type of test, especially that which dealt with verbal materials, was undoubtedly a test of elementary reading and may well have been as effective a predictor as it was, because it discriminated between children who had already acquired the rudimentary skill and those who had not. The ineffectiveness of such tests to discriminate between other than broad groupings of success and failure led to the development of the diagnostic aspect of such tests. It can be argued that these more recent sub-tests involve reading of a sort if one uses the term to cover the ability of being able to perceive relationships between symbols and their meaning and not simply the translation of purely verbal material.

To illustrate the nature of the problem at this earliest of reading stages, the analogy to learning tennis is perhaps useful. One can test separately the ability of the individual to see and follow the movement of the ball and to co-ordinate eye, hand and foot, as one can record the length of reach or the strength of wrist movement. If all these contributary skills are present to a sufficient degree, then the act of learning to serve will be possible and probably easy to acquire. If, however, any of these contributary skills is undeveloped or untrained, this is likely to hinder or even to prevent the achievement of a successful service. The older type of reading readiness test resembled the situation in which the player is given a racquet and a ball, and judgments about his future tennis form are made, from what he manages to do with them—if he is able to do anything.

The Value of Reading Readiness Tests

Undoubtedly, reading readiness tests can be useful tools and are increasingly gaining in accuracy, precision and clarity of purpose. A good one enables the teacher to discover, or what is perhaps even more important to create, the " teachable moment " for each child, replacing the passive approach with its stress on maturational limitations, with a more active and initiating attitude. These tests can be of general use with new entrants or with those children admitted during a term, enabling the teacher to obtain an immediate impression of a child's needs and capabilities rather than to wait and acquire this by the slower process of personal observation.

On the other hand, the construction of such tests is a long process requiring continuous and detailed research. Since most of them have been designed in America, some of the items and the content are liable to be more familiar in that culture, and the norms established on American school populations rarely go as low as the age levels required in this country. Some tests seem to be unevenly balanced in construction, and their designers do not always seem to be aware of skills other than those they are measuring. Of course, the difficulty now is that as workers in this field obtain more knowledge about the complex nature of the ability to read, they have increasingly to decide whether to design batteries of tests which measure a wide range of different skills each at a more or less superficial level or whether to construct a test of one particular ability considered relevant to reading and consisting of several sub-tests each measuring one of the different forms this ability may take. For example, there seems to be a move away from the simple test of visual discrimination towards a series of sub-tests covering various types of visual perception.

Finally, some authorities and educationalists would question whether children of this age can in fact be tested in groups, and would suggest that tests do not provide any information which could not be obtained from sustained and directed observation on the teacher's part.

Teachers' Attitudes Towards and Recognition of Reading Readiness

Teachers in the Kent investigation, although having considerable experience in measuring ability and attainment by means of standardised tests, were unfamiliar with reading readiness tests. The majority of the teachers, however, believed in the concept of reading readiness but found it difficult to say how they assessed it.

Attitudes Towards Reading Readiness of the Head of 60 Schools

Attitude Towards Reading Readiness	Urban					Rural		Total
	J.M.&I.	J.M.	J.B.	J.G.	I. & Std.1	J.M.&I.	J.M.†	
Believed in ..	14	3	0	1	8	19	0	45
Did not believe in	1	1	0	0	0	2	0	4
Unable to answer	0	3	2	1	0	4	1	11
Total ..	15	7	2	2	8	25	1	60

At first, most stated that assessing reading readiness was a matter of " instinct " but when they were asked to explain this in greater detail, all but six were able to express what they meant in more concrete terms. The most frequently mentioned method was that of noting whether the child showed a desire to learn to read—by being interested in books, looking at them, or asking about words. Some teachers mentioned the choice of books rather than sand and water in a free choice period, whilst others looked for skills such as the ability to interpret pictures, knowledge of the primary colours, and being able to carry out directions. Other indications were said to be the child's social, physical or language development. The determination of whether a child was ready to read rested primarily on the teachers' ability to observe those forms of behaviour which they had come to accept as indications of readiness.

---

†J.M. & I. = Junior Mixed and Infant.
J.M. = Junior Mixed.
J.B. = Junior Boys.
J.G. = Junior Girls.
I. & Std. I. = Infants and Standard I.

The four schools who did not believe in the concept of reading readiness were amongst those who started formal teaching with the entrants. In this study a formal approach was found to be significant at the one per cent. level when correlated with reading attainment scores, but after eliminating the effects of Urban/Rural location, Socio-economic Status and School Size, this correlation was no longer significant. The difficulty in evaluating this evidence is that we do not know precisely what the teachers in Kent understood by the term reading readiness nor to what extent their attitude actually affected their teaching methods, that is whether they waited for signs of readiness or whether they actively set about developing those attitudes and abilities which they had come to recognise as signs of the readiness to learn to read.

Conclusion

The Kent study shows that the task of teaching beginners varies according to the children's home background; that some are indeed teaching beginners whilst others are teaching children already familiar with the skill, and that the subsequent rate of progress is likely to depend to a large extent upon an accurate assessment of the pupil's level of reading attainment or reading readiness during the first few months at school. This may be determined either by personal observation or the use of the appropriate test measures. The changing conception of reading readiness tests illustrates the importance attached to the early school years. Increasingly, it is being realised that it is not necessary to wait for symptoms of backwardness to develop, but rather that every effort should be made to diagnose weaknesses as soon as possible in the child's school career so that the appropriate measures of guidance and training may be adopted. In the field of test construction in the past the approach has resembled the attitude of the Kent teachers, being predominately intuitive but it would seem that values which have been implicit are now being made explicit. The revaluation of aims and purposes in this field should undoubtedly improve the accuracy of these measures, and a more general awareness of their scope and limitations should increase the value of such tools for the teacher in the classroom.

As the child grows older, individual attributes become more important but at this early stage much depends upon the teacher, upon her powers of observation, her knowledge of methods and techniques, and the ability to inspire that confidence which stems from a certainty of purpose and which avoids the type of classroom confusion in which faults can easily be acquired that with time and repetition become so difficult to eradicate. At present, we know very little about the effect of teachers' attitudes on the effectiveness of methods of teaching reading. We know children come to school with a variety of reading and pre-reading experience, but there is relatively little information as to how teachers recognise and evaluate their pupils' background and previous experience, or of how this knowledge affects teachers' attitudes and their subsequent choice of teaching method. A particular method of teaching reading may be more effective with children from a particular background where as a teacher's choice of method can be determined either by her awareness of these background influences or by the satisfaction of her own personality needs which a particular method provides. To teach beginners, as with teaching any group, the happy medium is probably to satisfy the individual needs of the pupils by a method which can also be personally satisfying to the teacher who has to use it.

Editorial Note :

An appendix dealing wiih Group Tests of Reading Readiness will be published later, owing to lack of space in this issue.

Bibliography

General

BERON, A., *The Five-Year-Old.* Unpublished Ph.D. Thesis, University of the Witwatersrand, S. Africa, 1957.
BUHLER, C., *From Birth to Maturity.* London: Routledge, 1945.
GESELL, A., and ILG, F. L., *The Child From Five to Ten.* New York: Harper & Brothers, 1946.
HAVIGHURST, R. J., *Human Development and Education.* Longmans, Green & Co., 1953.
ISAACS, S., *Intellectual Growth in Young Children.* London: Routledge, 1930.
ISAACS, S., *The Psychological Aspects of Child Development.* University of London Institute of Educ. London: Evans Brothers, 1935. Reprint 1949.
TEMPLIN, M. C., *Certain Language Skills in Children.* University of Minnesota. Institute of Child Welfare, Mono. Series No. 26, 1957.
VALENTINE, C. W., " A Critical Notice of 'The Child From Five to Ten,' by Arnold Gesell and Frances L. Ilg." *Brit. J. Educ. Psy.*, 18, Part 3, 1948.
VALENTINE, C. W., *The Norman Child.* Pelican Books, No. A255, 1956.
WATTS, A. F., *The Language and Mental Development of Children.* London: Harrap & Co., 1944.

Reading Readiness

BUROS, O. K., *The Third Mental Measurement Yearbook.* New Brunswick: Rutgers University Press, 1949.
BUROS, O. K., *The Fourth Mental Measurement Yearbook.* New Jersey: The Gryphon Press, 1953.
GOINS, J. T., *Visual Perceptual Abilities and Early Reading Progress.* Supp. Educ. Mono., No. 87, The University of Chicago Press, Feb., 1958.
HARRISON, M. L., *Reading Readiness.* New York: Houghton Mifflin Co., 1939.
MORRIS, J. M., *Reading in the Primary School.* Publication No. 12 of the National Foundation for Educational Research. London: Newnes, 1959.
ROBERTSON, F. P., and HALL, W. E., " Concerning Reading Readiness Tests." *Bulletin of the Ohio Conference on Reading, No.* 3. Columbus, Ohio: Ohio State University Press, 1942.
RUSSELL, D. H., *Children Learn to Read.* Ginn & Co., 1949.
RUSSELL, D. H., and GROFF, P. J., " Personal Factors Influencing Perception in Reading." *Education*, May, 1955.
STROUD, J. B. " Rate of Visual Perception as a Factor in Rate of Reading." *Journal Educ. Psy.*, 36, Nov., 1945.
THE SCOTTISH COUNCIL FOR RESEARCH IN EDUCATION, *Studies in Reading*, Vol. I, " The Early Stages of Reading: A Review of Recent Investigations," by W. B. Inglis, University of London Press, 1948.
WITTY, P., and KOPEL, D., *Reading and the Educative Process.* Boston: Ginn & Co., 1939.

Educational Guidance—II

INTEREST TESTING IN EDUCATIONAL AND VOCATIONAL GUIDANCE

by S. Wiegersma,
Principal Psychologist, Nederlands Instituut Voor Praeventieve Geneeskunde
and
Frank Barr

Introduction

It is often believed that a strong interest in a task, whether at school or at work, is an essential or at least a vital factor in the achievement of the best results. Candidates for a particular course of education or a type of work are often asked about their interest in the task which they seek to undertake and frequently much is based on their replies. There are, however, assumptions underlying this acceptance of the importance of expressed interests which should be examined.

It is, for example, important to know whether in fact a pattern of interests exists which possibly along or in alliance with other qualities distinguishes the successful from the unsuccessful entrants to particular school courses or occupations. Does research evidence justify the commonly-held belief that candidates for training as teachers, farmers or craftsmen should be interested in " book-learning," " the out-door life " and " practical things " respectively? Can we then show that success in an engineering course and in the profession of engineer, let us say, requires a pattern of interests distinct from that exhibited by successful art students?

If such evidence exists, then advisors and selectors are faced with a second task, that of evaluating the credibility of the candidate's statements of interests and of assessing the relationship between such an expression and the educational and vocational pattern. Differences of sex, of home and school background and in the amount and kind of information about the desired career available to the candidate may make his statement unrealistic or unreliable—characteristics which in fact are often found to be typical of the expressed interests of adolescents. Accordingly, apart all together from other considerations, it might be unwise to encourage a career with British Railways upon the evidence of an isolated interest in " train spotting " or to have much confidence that a pupil's strong liking for history lessons will predict outstanding success as a history teacher.

This leads to a further and more subtle point. Advice based upon expressed interests may indeed prove to be excellent but for reasons other than those for which they have been given. It happens, as indeed we have all seen it do, that appetite grows by what it feeds upon and that the distinctive interests shown by pupils following a given course or by successful members of a trade or profession have, in fact, been created by the study, training or experience they have had. If this is generally or wholly true then the expression of an initial interest will tell us little in itself; what we need to know is whether the individual has the disposition to form interests of the kind which are an essential element in success. The question in fact should be put in the general form; how far can we judge the basic psychological needs of the student from his present interests and how far does this presumably fundamental pattern predispose him to form those interests which will foster his chosen studies and career? Practically, too, we need to know how such initial interests or their underlying needs can be measured efficiently and simply enough to form valuable components of the guidance procedure.

On most of these points there are a number of unverified opinions and, on some at least, a considerable research literature which it will be worthwhile to summarize. For this purpose it is convenient to deal with the reports in three broad sections: the contributions from America, other countries and the United Kingdom.

1. Research Evidence from America

There is a difference in purpose between American and European guidance procedures which probably reflects differences in basic educational and social concepts and consequently in educational organisation. In several European countries there is a distinct break between the primary and secondary stages occurring, for example, in this country at 11 + and in Holland at 12 + years. Here the emphasis is upon the two-fold task of selecting groups of children who differ in general ability and special skills and then allocating them to suitable courses of secondary education. Only later, towards the end of the secondary school course, is vocational advice given, and the scope and content of this guidance are largely determined by the type of school to which the child was originally sent.

In the American system there is no sharp organizational differentiation between schools in the early adolescent years and guidance at its best is a continuous process. The main break occurs when the adolescent in fact leaves full-time education to start work. Guidance at this stage tends, therefore, to be mainly vocational in character, seeking to help boys and girls to choose careers in which they will have some success and satisfaction. It is to be expected that this difference affects the way in which the role of interest measurement is studied on the two continents, the one seeking to find occupational patterns of interest and the other studying individual bias to, for example, technical or academic studies as a basis on which to determine suitable courses of education. The difference, however, is not sharp and is one of emphasis; in fact, guidance of both kinds is given in America and Europe. Hence, American work provides leads of many kinds, and at least until the end of the last war was almost the sole considerable body of information on the measurement of interest.

From this mass of work emerged five important studies from which most of what follows is taken. The first, by Fryer, brings together most of the research on interests before 1930; the second, by Strong, brings the analysis up to date. In addition the work of Kuder is of importance because of its influence upon European measurement techniques, and of Ginzberg and Super because of their attempts to assess the true role of abilities and vocational interests in the choice of a career. It is of value to consider their evidence at some length as it studies the basic issues both of the nature and measurement of interests.

(*a*) *Fryer*

From scores of research reports Fryer attempted to isolate those aspects of the nature of interests which he considered to be important for the purposes of giving educational and vocational advice. One of his main concerns was to investigate the possibility of predicting an individual's success in an occupation from a previous measurement of his interests. Prediction, however, depends upon several factors. Given the measuring instruments it is essential to try to discover whether there exists an occupational pattern of interests whose possession by a candidate for entrance to that occupation would considerably aid a subsequent high achievement. Fryer concluded that it was possible to isolate interest patterns which distinguish groups of people from each other according to their type of course or career—for example, groups of arts students from groups of engineering students, and dentists from farmers. He concluded, however, that it would be rash to base vocational and educational guidance mainly upon a coincidence between the individual's pattern of interests and that displayed by the educational or vocational group he wanted to enter. He also found evidence that not only the type, or quality, of interest pattern was important but that the number of the isolated interests which formed separate strands of the pattern were also associated with success, but in a different way from that which popular opinion holds to be true. It is sometimes thought that a "Jack of all Trades," handicapped by the number and variety of his interests, "is master of none." When, however, a number of eminent people, chosen from the American "Who's Who," were questioned about their personal interests it was found that many and varied interests characterised those of markedly high achievements. Other studies showed that the converse was also true—that people with few interests were often those who achieved little satisfaction in life and little success in their jobs. Later, this conclusion was found to be true in Europe.

However, isolating such vocational patterns is of little value if interest patterns themselves are unstable or the measurement of them is unreliable. The interests of adolescents are often thought to be notoriously fickle and Fryer could find little evidence to challenge that view seeriously. In fact, he summarised the evidence by stating that there are only 50 chances out of 100 that the expressed interests of a "teenager" would remain the same over a period of one year—data which does not give confidence in the possibilities of prediction.

Some of this change may be attributed to a lack of vocational knowledge on the part of the adolescent and to the subsequent widening of his educational and vocational horizons with fresh experiences. For example, a student may state an interest in "teaching geography" as a career and study accordingly. At the beginning his interest in this subject will be paramount but as he studies the wider aspects of the discipline, inevitably he will come into contact with history, geology, meteorology and other branches of knowledge previously beyond his range of experience. His interest, being stimulated by one of them, may very well encourage him to take it as an "Honours" subject and eventually lead him to work in the Meteorological Office or a Petroleum Company instead of with a Local Education Authority as was his original intention.

Fryer quotes many such examples of the way in which vocational ambitions deviate from the course originally planned by the individual as a result of coming into contact with new interest stimuli. This, of course, has important implications for those who plan the curricula of our secondary schools. In particular, it calls into question the wisdom of allowing children to choose a relatively few topics to study too early in their school life. It will be valuable to note whether the European evidence supports this plea for a varied rather than a restricted syllabus.

One further pertinent question may be posed: are interests strongly affected by ability? If they are then the objection, put forward below, to interviewers rating the interests of students must be withdrawn, and in fact if the connection is at all strong, then the task of measuring interests might perhaps be better done by using the techniques for measuring ability. However, the balance of the evidence shows that the interrelation is complex. It is true that able children and adolescents are likely to have a greater number of more varied and intellectually more challenging interests than the less able, a fact brought out in Terman's studies and to some extent by the work of Strong referred to later, but differences are probably qualitative and related also to non-intellectual personality variables. Hence, in practice, it is found that the two aspects—ability and interest—as tested are relatively independent and that a measure of one does not give a good estimate of the other. This is Fryer's conclusion; later, Vernon found evidence to support it for English groups.

For the purpose of measurement Fryer accepted a distinction between " subjectige " and " objective " expressions of interest and concluded that a person's interest in an object or activity was expressed " subjectively " by a verbal statement of like, dislike or indifference whilst an objective expression of interest would be shown by the person's real or operational reaction to the object or activity.

The two expressions do not necessarily coincide. If, for example, the candidate is asked to express his interest in different school or college courses then he may state verbally that he likes engineering rather than art. An objective observer might, however, see the same candidate in his spare time rejecting an engineering activity such as dismantling a bicycle in favour of sketching a nearby church, an example which serves to illustrate that the only really objective statement of an interest (or an aversion) will be what a person does when he has the opportunity.

This is not to say that interest, or lack of it, expressed verbally in response to a question is a totally unsure guide; it is to point out that because a verbal statement is different in certain essential ways from the action it describes, it may provoke a response different from that which could occur in a concrete situation. However, corresponding roughly to the two ways, the subjective (verbal) and the objective (concrete or operational) expressions, two techniques have been devised to test interests, each with advantages and disadvantages.

(i) *Subjective Interest Measurement.* The crudest form of subjective interest measurement is the one commonly used, and on which much is built. It consists of asking a candidate in a personal interview to state the limits and degree of his interest in certain subjects, objects or activities. Obviously, this procedure is open to grave errors which may invalidate the replies to the point where they are useless or misleading. The candidate may have thought about the questions very little or have little knowledge of the topics mentioned by the interviewers. Even if he has studied the matter, his reply may be biased by considerations other than those of purely personal interest. Many a school task has been undertaken to please a teacher and many a candidate for a job has claimed a recreational interest to which he is secretly indifferent, in the hope of creating a good impression on his panel of interviewers. When the question is " open-ended," usually in the simple form, " Tell me something about your hobbies," it may be even worse. In neither case is there any real basis of comparison between candidates and the assessment of patterns, strengths and weaknesses relies entirely upon the intuitive, unchecked judgment of the interviewer.

Some of the crudity can be taken out of this form of assessment by the use of questionnaires. The usually numerous and standard questions serve to stimulate thought on the part of the candidate about the matters under discussion and to present each with a more-or-less similar situation. However, there is at once the problem of how a complex battery of different questions can yield from the mass of detailed answers, a simple and easily understood statement about interests. Also, reactions to isolated or even to a large number of questions concerning interests in topics such as occupations, hobbies, school subjects and personality characteristics may not provide a reliable basis for interest testing. This has lead to the development of the more objective Interest Inventories of which the best-known are those of Strong and Kuder which are considered below.

(*ii*) *Objective Measurements of Interests.* One common method, often attempted at an interview, involves the assessment of a respondent's interests by other people. Generally, this takes the form of rating him as having shown over some considerable period, high, average or low interest in a given school subject. Research evidence indicates that such assessments of interests are often unjustifiably influenced by the ability of the pupils in that particular school subject. Another objection arises from the inability of most people to grade degrees of interest satisfactorily into more than five groups, such as:

Strong Interest Interest Indifference Slight Aversion
Strong Aversion

Indeed, some research workers advise the use of only the first, third and last of these groups in guidance procedures.

To overcome some of these problems several lines of development have been explored which attempt to give more objective measurements and to get nearer to the overt situation in which an interest is displayed in action. One of the most common is the Information Test technique. This is based upon the assumption that a person's knowledge of a particular school course, job or field of interest will be greater if he has, in fact, already shown interest in it, and therefore acquired some special knowledge. Conversely, aversion or indifference will show itself by comparative ignorance. For example, to test an objective interest in woodwork the respondent might be given a series of drawings of tools or joints which are encountered in the craft. If he is interested in woodwork and has reinforced his interest by making models in his spare time then it is reasonable to expect him to be able to name more items with greater accuracy than someone who dislikes this activity and consequently only undertakes it in times of dire need.

However, as Fryer concluded, tests of this kind tend to be heavily influenced by general ability, particularly if they attempt to include too much detail, are too complicated or sample only a small area of the field to be tested. On the whole, he was cautious about recommending this type of technique and therefore surveyed other methods as well.

Among these is the Free Association Method, whereby the subject is given an interest stimulus in the form of a key-word which may come from the technical vocabulary of the craft or vocation concerned. The subject is then asked to state or write the first word which comes into his mind, if the discrete variation of the test is employed or, if the continuous form of the test is used, he is asked to continue recording words until he is told to stop. One of the earlier users of this technique was Wyman who collected 120 words, to stimulate free associations by the discrete method and equally distributed between the three fields of intellectual, social and activity interests. It has been used successfully with American children between the ages of 8 and 15 years.

Three other techniques are also worthy of note. Burtt experimented with two methods of testing objective interests. The first assumes that people learn more effectively if the process is accompanied by the pleasant feeling of interest rather than the unpleasant feelings of indifference or aversion. The second is based upon the notion that the stronger the degree of interest in any given task the less likely is it that the subject's attention will be distracted from his task. However, Fryer suggests that the first method is more a test of verbal ability and the second a test of motivation rather than of interests—a suggestion which illustrates some of the complexity of the issues involved.

Research workers have also tried to take into account the play interests, the collections made, the amount and type of reading and other leisure-time activities of school pupils as being objective reactions to interest stimuli. Although Lehman developed a pencil and paper test based upon this principle in America, the most common assessment of these stimuli in this country remains the face-to-face interview and the questionnaire.

Fryer concludes his study of the techniques of measurement with a recommendation that a minimum test battery for children between the ages of twelve and sixteen years should include the following components:

(i) Estimates by others (e.g. teachers) of the leading educational and vocational interests of the children.

(ii) Measures, which have particular reference to the pupil's present and possible future courses, of:

- (*a*) Subjective Interests (e.g. Garretson's Preference Questionnaire);
- (*b*) Objective Interests (e.g. Wyman's Free Association Test and Lehman's Play Quiz).

However, the tests which Fryer recommends for use with school children are of American origin for use under American conditions, and they could need a lot of adaptation and research before becoming of value under British conditions.

(*b*) *Strong*

The work of Fryer and his contemporaries was carried out during the early formative period of the study of interest measurement. Although he poses pertinent questions as to the value of such measurements his study of techniques is more a survey of possibly fruitful lines of development than of refined methods and well-tried instruments.

The conclusions of some later American reports are more optimistic, perhaps as the result of the greater experience they have gained in marking and using interest tests. It is also interesting to note the greater emphasis which recent American research places upon vocational guidance. In this particular field one of the best-known research workers is Strong, who has developed an important interest test and by its use over a quarter of a century has collected some valuable data the latter part of which bridges the gap between our own day and the date of Fryer's work.

In constructing his *Vocational Interest Blank* he assumed that patterns of interest exist which distinguish between different vocational groups. If the research evidence supports this assumption and the measuring instrument proves to be efficient then educational advisors would have a powerful tool with which to guide students towards courses leading to their chosen career.

Strong collected a list of hundreds of items such as " to be an actor," " to play bridge," " to teach children " and " people with a hooked nose " for which the respondent had to state his like, dislike or indifference. It will be noticed that these are of two types: those like the first and third which have evident relevance and face validity and those like the second and fourth which seem irrelevent or even frankly ludicrous. However, Strong is concerned to get two kinds of information. To items of the first evidently valid type the answers are probably of value by themselves. Strong's inventory, however, is interested in the pattern of scores and not in the individual answer. For the purposes of giving advice about taking an engineering career, for example, apparently irrational dislikes—for people with hooked noses—may be irrelevant, but if it is empirically shown to characterise engineers and to distinguish them from people following other vocations then, added to other similarly discriminating items, it can form part of an efficient instrument. In fact, of course, later versions of certain items of this type, though they may contribute to discrimination, had to be excluded because they tend to antagonise the respondents. Others, more innocuous in form however, were kept in.

The original list of items was given to a general group of people who pursued a variety of occupations, and to groups of people engaged in only one career, such as engineering. A minimum of 500 people for each group was preferred, although Strong found it impossible to attain this ideal with every group. Respondents were asked to record whether they liked, disliked or were indifferent to each item and each reaction was accorded a positive, negative or zero score depending upon whether it distinguished between the particular and the general groups. The items which significantly distinguished engineers from the general population could then be used to indicate candidates who had a pattern of interests approximating to that characteristic of those already successfully engaged in the occupation.

Patterns of interests have been isolated in this way for about forty male and nearly thirty female occupations, whilst special scales have also been developed to test occupational maturity and the level of occupational ambitions as expressed by interests. The test, however, has not been widely used in Europe, although one example of its use is quoted later, because of its several disadvantages. The isolation of occupational interest patterns is a laborious task and its American form cannot be used in this country without considerable adaptation. Primarily, it was intended for use with students of the American College level, which includes age groups from about sixteen to twenty years and in content it is rather too difficult and lengthy for use with younger pupils—for example, in an " 11+ " examination.

It will be readily understood, too, that scoring this test makes such heavy demands upon the time of the marker that large-scale application is impossible unless machine-computers are available. Reference must also be made to the warning given by Benton and Kornhauser, Vernon and Parry that this type of test is open to " cheating " on the part of the respondent. However, whilst noting the disadvantages attached to this inventory, the balance of evidence supports the view that the data obtained from its use are sound and valuable.

By using the Vocational Interest Blank with a group of university students, Strong obtained important evidence about the stability of vocational interests which, as Fryer found, he concluded to be an essential prerequisite of any attempt to use interest measurements for the purpose of prediction. His sample consisted of two main age groups, both from Stamford University and both sub-divided according to the students' stated vocational preference. The older group, of college Seniors, were first tested in 1927 and re-tested in 1932, 1937 and 1949, whilst the dates of testing for the younger group, of College Freshmen, were 1930, 1931, 1939 and 1949. The size of the sub-groups ranged from 50 to 228.

He found that similarities in the order of the individual items in a list of interests remained very high even over many years. The results were expressed numerically in such a way that if the list of vocational preferences given at the beginning of a certain period of time remains unchanged at the end of that period the coefficient is 1.0, whilst if the second list bears no relation to the first it will be 0.0. By using this method Strong found that over a period of five years he obtained a coefficient of 0.84 and that this declined only to the extent of becoming 0.82 after ten years and 0.75 after twenty years. In another study of the vocational preferences of a group of 306 University engineering students he found that the correlation coefficient after one year was 0.91 and that this declined to 0.77 after nine years, but then only to 0.76 after a further ten years. Although the decline in the second study is greater than in the first it is still remarkably small.

The students who were tested in these two studies were relatively able and mature so Strong also tested the popularly-held assumption that the vocational interests held by younger people are less stable than those of older groups. Although the evidence justified this assumption to a certain extent the interests did not fluctuate to the same degree as reported by the earlier work of Fryer. Thus, the degree of permanence found for the interests of seventeen-year-old boys over a period of between two and three years was found to be 0.81 and for College Freshmen over a period of nineteen years 0.72, both being much higher than is often assumed. In general, he found that between the ages of 15 and 25 years with this group of people, one-third of the reported change in vocational interest occurs between the ages of 15+ and 16+ years, a further third between 16+ and 18+ and the last third between 18+ and 25+ years. After that age interests appear to become better established, unlike other phenomena such as memory, until about 55 years of age.

He concluded that the predictive value of interest measurements is influenced by the age at which the student is tested being greater with older than younger ones. Most secondary school children in this country have to decide what jobs to take at the age of 15 years when they can legally leave full-time education, and most of their vocational guidance is given before this age. It will be valuable, therefore, to consider later whether Strong's conclusion is applicable to British conditions.

Concerning the number, or span, of interests and its relationships with ability, Strong was able to add confirmatory evidence to Fryer's work. As previously mentioned, his Vocational Interest Blank can give patterns of interests for many occupations. By giving 34 of these occupational scales to a group of American engineering graduates he calculated that each graduate would achieve an average of three " A's," that is, each would show a strong interest in three occupations. In fact, he found that the average span for each graduate was 4.8 and put forward the view that high ability was the most likely cause for this result. Thus, although the level of ability may not affect the type, or quality of interests, it may very well affect the number of interests held by individuals.

Strong concludes that the scores obtained by his inventory are nearly comparable in their degree of permanence over a period of ten to twenty years to those derived from verbal ability tests. Much more evidence is needed before this can be finally accepted although the use of inventoried vocational interests with this type of student does appear to be justified in educational and vocational guidance procedures. However, caution is necessary in the use of this technique for predictive purposes. The inventoried interests of these students over-lap to a considerable extent, as is shown by the spread of the span of interests quoted above. A vocational term such as " engineer " is wide and such an occupation is also closely similar to others. In giving advice it would be difficult to predict success in any one specific job although the above results indicate that it is possible to give advice to a candidate on the basis of his vocational interest pattern as to his suitability in a fairly broad field of occupations. As an example of this conclusion Strong found with his group of 306 Stanford University Freshmen that the relationship between engineering and physical science scores was very strong but that this interrelationship weakened progressively with the scores of biological sciences, business studies, social sciences, law and languages. Thus, there were 82 chances in 100 that if a student scored an "A" in engineering interests he would graduate at least in some physical *or* biological science; it would be much more difficult to predict graduation in more circumscribed engineering studies depending upon the degree of specificity.

(*c*) *The Kuder Preference Record*

Strong's technique and evidence are very valuable although, because of its disadvantages, his test is not widely used in Europe. An American test which has found more favour as a model is the *Kuder Preference Record*.

Unlike Strong's items the interest stimuli in the Kuder test are only presented in the form of activities such as " painting china " and " selling vacuum cleaners." The " forced-choice " principle is used in answering the items in which three activities are listed. In answering each of the 168 items the candidate must indicate the activity stimuli which he most and least prefers.

Another difference with Strong's inventory, which is constructed upon *a posteriori* grounds by grouping the test items only after they have been given to the occupational groups, is that the Kuder inventory arranges its items upon *a priori* considerations. Thus, it was assumed, and later proved to be valid, that there existed ten main categories of interest reactions: outdoor, mechanical, computational, scientific, persuasive, artistic, literary, musical, social service and clerical.

As the Kuder inventory takes less time to administer and score—it can be done by hand even in large-scale applications—and because the content is less extensive and less likely to offend respondents it has appealed more to European research workers. However, a warning given by the Atkinson committee should be noted. This was a Canadian study which assessed the value of the instrument for the purposes of giving individual students advice about the type of course they should take upon entrance to the university. The predictive value of this test was found to be low, mainly because of the great overlap which occurred between the interests of students of different subjects, although the committee admitted that more evidence was needed before this finding could be accepted as conclusive and that it did not invalidate the instrument's use for other purposes of vocational guidance and research.

(*d*) *The role of interests in theories of Vocational Development*

Finally, some American research workers have attempted to place in perspective the role which an individual's vocational interests play in the stages through which he passes from the time when he first expresses a vague liking for a certain career to the final acceptance of a job. Ginzberg considers that occupational choice is a process of continuous development over a period of about ten years. It ends in a compromise between the influence of interests, abilities, a scale of values concerning job attributes such as pay and pensions, and the employment opportunities available. Once completed it is largely irreversible because of the investments of time, money and the disinclination of an individual to change his ways of life. Within this period of development he distinguishes three main phases, the earliest being that of the child's choice, essentially one of fantasy, governed largely by the wish to imitate adults. This is later superseded by the young adolescent's rather more realistic, but still tentative, choice of a career which is at first determined by interest but later largely replaced by considerations of personal abilities, skills and the relative advantages and disadvantages of particular jobs. Finally, at the school leaving age there is a period of realistic choice when alternative occupations are finally considered and a specific job chosen.

Super considers that the special contribution of this theory lies in the hypothesis of the successive dominance of interests, abilities and job attributes as determinants of choice before reality begins to play a major role. However, he finds four main faults: that it does not build sufficiently upon other research data—and in particular that derived from studies of the predictive value of inventoried interests; that choice is defined as a passive preference rather than as an active decision to enter a job which will influence the age at which reality plays an important part; that there is a false distinction made between the terms " choice " and " adjustment " whereas in fact they blend; and that there is little consideration of how the compromise is made between Ginzberg's variables of interests, abilities, job attributes and opportunities.

This last point Super considers to be crucial to the whole problem and analyses it in detail. Individuals vary considerably in their interests, abilities and personalities and are qualified by virtue of these characteristics to succeed in a number of occupations, as Strong found. As occupations also have overlapping, patterns of these characteristics not only has each person a choice of jobs but within each job will be found persons of slightly different characteristics. The blending of the two patterns, resulting in occupational success and individual satisfaction, is again seen as a continuous process of five main stages: growth; exploration, in which fantasy is succeeded by tentative and then more realistic choices; and then a period in which the choices are established through the phases of trial and error before finally becoming stable. This stability is then maintained during the adult life until it eventually declines with age.

2. Research Evidence from other Countries

Most countries with complex industrial structures have vocational guidance problems which are similar to those studied by the American research workers. At the end of every academic session there are many thousands of secondary school leavers possessing different patterns of interests and abilities seeking to enter careers and courses of further education which require different levels of skill and educational achievement. To adjust the needs of the one to the other is a task of great difficulty which some countries have sought to resolve by using data and adapting techniques derived from American sources for local conditions.

(*a*) *Australia*

Perhaps of wide application to the school-leavers of the United Kingdom is the data derived from the development of an Australian interest test. This investigation attempted to assess secondary school pupils' vocational preferences in Tasmania by the use of the Rothwell-Miller Vocational Interest Blank which lists occupations suitable for both boys and girls.

The occupations are grouped on *a priori* grounds, as is the Kuder inventory, on the statistically tested assumption that there are twelve distinct patterns of occupational interest. These are outdoor, mechanical, computational, scientific, personal contact, aesthetic, literary, musical, social service, clerical, practical and medical. The list is divided into groups so that they include one example from each of the 12 patterns of occupational interest. The pupil is asked to grade the occupations in each group from 1 to 12 in descending order of interest and from this it is a simple process to analyse the particular occupational preferences of the children.

This inventory has been used with groups aged from 12 years to adult, including secondary school pupils, college students and adults actually pursuing their vocations. The results support Strong's contention that most change in vocational interests occurs before the age of 18 years, this being more marked with younger age groups than with the older ones, and Rothwell advises that the inventory should be used mainly with children of 13 years and older.

Investigating the types of changes which occur, Weeks, using this test, also with Australian children, is reported to have found significant changes in the order of the preferred occupations between different age groups. Most change occurs in the middle of the list of preferences with the first two or three strong likes and dislikes remaining relatively stable. However, even here changes occur. He administered the inventory to groups of private secondary school pupils in one boys' and one girls' school. Between the ages of 11 and 16 years, girls changed their preferences from Clerical and Mechanical towards Medical and Scientific types, while boys preferred Computational and Scientific to Practical and Mechanical, although the latter regained some of its popularity at 17 years of age.

However, in many European countries the task of allocating children to different types of secondary schools is added to that of giving vocational advice to the older pupils. In fact, allocation at eleven or even at thirteen is itself a form of premature vocational guidance for the range of occupations which are available to the pupils of different types of secondary schools is limited by the level and type of syllabus and examinations which are provided. This problem has become steadily more acute as a result of the widespread post-war reforms in educational organisation. In many countries, for example, Belgium, France, Germany, Holland, Italy and the United Kingdom, techniques were developed to measure the interests of younger pupils, mainly of 11 to 13 years of age, for the purpose of selecting or guiding them to suitable courses of secondary education. Generally, the Kuder method was preferred to that of Strong and psychologists such as Irle in Germany and Chaudagne in France have developed tests of their own based upon his technique.

(*b*) *Holland*

A Dutch study is of particular value to educational advisers in this country because of its comprehensive nature and the close similarity to our own of the types of schools in which it was conducted.

In Holland most pupils enter one of four main types of secondary schools when they are 12 years old, after having had six years of primary school eductaion. The four types available are grammar schools, preparing pupils mainly for university entrance; " extension " schools which give a preparation for entrance to vocational training colleges and for clerical and commercial work; " trade " schools, which combine a " general " education with pre-vocational training for skilled trades; and " junior " secondary schools which give a " general " education at a comparatively simple level together with some manual training. Generally, pupils of the last type are prepared for semi- and unskilled work, although some enter apprenticeships. Of the pupils transferring from primary to secondary schools, about 15%, 30%, 40% and 10% go to these four types respectively. One important difference from our own system is that children in the primary schools are not promoted automatically from one form to another at the end of each academic year but are only promoted by merit, those of a poor standard being required to repeat the whole of a year's course. Thus, whereas the ages of pupils in British classes may vary only by a few months, in Holland the same grade may include pupils whose ages vary by one year or more.

A representative group of children was chosen for testing which included 478 girls and 531 boys who were in their last year of the primary school. The schools were chosen at random from a directory and the tests were administered at the end of the last primary school year when they had already been allocated to their different types of secondary schools. Two related problems were selected for investigation: that of isolating interest patterns which differentiated between the groups of children going to different types of secondary schools, and that of using interest measures to predict success in the chosen school courses and thus to reduce the number of misfits and failures.

The instrument used in the investigation was a Dutch adaptation of a vocational interest test originally developed in Germany by Irle. It includes 162 items which are grouped in the Kuder method. In each item four activities belonging to different interest patterns are compared, the pupil marking the one most strongly preferred. By means of this test the pupils' strength of interest is shown in vocational interest patterns and at two educational levels—educational and social work; applied art; literature and history; catering; a lower educational level; an upper educational level; agriculture and forestry; clerical and computational work; "persuasion" (in all kinds of commercial work); scientific and engineering; and mechanical. The upper and lower educational levels are characteristic of pupils in upper and lower school streams respectively.

When the test results were analysed important differences were noticed in the type of educational activities which interested boys and girls. The sequence of interest patterns given in the preceding paragraph represents the decreasing order of preferences of girls but the increasing order as marked by boys (reading left to right). The differences were particularly pronounced with the first three and the last three patterns, a result which supports, although it does not explain, the popular assumption that girls are more interested than boys in educational and social work, art, literature and history, whilst boys are more interested than girls in mechanical and scientific studies, engineering, and in salesmanship.

The data derived from the first part of the investigation does indeed suggest that the interest patterns derived from each of the four secondary school destination groups are distinctive. If the scientific and literary patterns are accepted as measuring intellectual interests, and the catering, industrial and agricultural patterns as being mainly manual in character the sequence of school types which describes a decreasing liking for intellectual activities and an increasing liking for manual activities on the part of the children going to them is grammar, "extension," "trade" and "junior."

There are, of course, interesting deviations from this general sequence. Apparently, grammar school girls like quite strongly the agricultural pattern of interests which is, of course, essentially manual in character. This interest may be created by the widespread popularity of gardening amongst mothers of "middle-class" background. In fact, this may give a clue to the relationship between the above sequence of interest patterns and types of schools. The home background exerts a considerable influence upon a child's school performance and probably also upon his or her pattern of interests, particularly when such educational and vocational patterns are emerging at about this age. Children from homes which provide a rich variety of intellectually interesting stimuli may very well be expected to score highly on the appropriate intellectual interest pattern. Similarly, if the level of educational and vocational aspiration is high and the children are encouraged to go to university rather than leave school as soon as possible it is not difficult to imagine a situation in which they will turn away from the semi- and unskilled manual occupations characteristic of early school leavers.

This evidence supports the contention that distinct educational interest patterns exist even as early as the end of the primary school career but it still remains to show whether interest scores can predict success in the secondary school. To do this a " follow-up " study was conducted of boys and girls who went to grammar schools. The test scores which were obtained at the end of the last year of the primary school were compared with the examination results at the end of the first year in the grammar schools. During this year all the children concerned received a similar course of education although they attended different schools. However, the school policy concerning why and how children should be promoted from the first to the second year courses differed. Some schools preferred to set an easy examination and to give the children more time to settle into the new school environment whilst others set a harder examination to allow only those who had a good chance of entering the universities to pass the next grade. Failures then could be guided to other types of school more suited to their level of ability as soon as possible. The prognostic value of the interest scores, it might be expected, would be more readily assessed when compared with the results of a difficult examination, success in which might only be expected from a combination of high ability and strongly-developed interest. Hence, a comparison was made between the interests scores of those who passed difficult school examinations and those who had failed both easy and hard ones. Because of the lapse of time necessary to get complete results only the first year ones were taken as a criterion of success for the purposes of prediction. This may, of course, mean that some of the children who passed this examination would fail subsequently.

Even within this modest and short-range criterion, there is a clear distinction between the successful and unsuccessful groups. The successful group shows a distinctive pattern of interest: high intellectual interest scores, a high performance on the " upper level " scale and a low one on the " lower level " scale; whilst the " failure " group scored highly on occupational patterns such as applied art, catering and agriculture. In particular, with girls the " persuasive " pattern was highly discriminating; only 10% of the successful group had scores on this pattern of over 40, compared with 70% in the " failure " group. A prediction of success thus appears to be possible, at least in the first grammar school year, for those children who exhibited to a marked degree the patterns of interests found to be typical of those last-year primary school children who are transferring to grammar schools.

This result is similar to that found in a study of Swedish students who were also of high ability and it might appear, therefore, that prediction of academic success based upon interest measurements, both at the beginning of the grammar school and university careers, may be strongly influenced by high ability. However, this does not seem to be the case because the correlation between interest and ability scores was found to be slight and the former appear to have a predictive value of their own.

This agrees with Fryer's conclusion, but it leads to an apparent and unresolved paradox. It has already been noted that whilst ability and interest test scores are unrelated, ability appears to affect the range and variety of the children's personal interests. An important aspect of the Dutch study supports this conclusion and adds a new element to it. The normal relationship between school type and interest pattern which has been described, of grammar school and "intellectual" interests on the one hand and trade courses and "trade" interests on the other, apparently holds good for children even of the poorest ability. However, when these least and most able groups are studied more closely, it is clear that the least able have a smaller span and less variety of interests than their more able contemporaries. Even sex differences of interest patterns, which are important with the more able children, dwindle in significance; in the case of the boys, for example, deviations from the average pattern in nine cases out of ten occurred in the direction of the interest patterns of girls of similar ability rather than of boys of higher ability.

The connection between the home background and the quality of childrens' interests, already noted in the case of the grammar school girls, is reinforced by this evidence concerning their less able contemporaries. Homes differ in the quality and range of the interest stimuli which they offer their children, some being biased towards intellectual pursuits, some encouraging more manual activities, whilst, at the lowest level, are those in which there is very little to stimulate children at all. Attention has already been drawn to the need to give older pupils a greater range of knowledge and experience upon which they can draw when choosing a career. Apparently there is also a need at an earlier age for the schools to foster a variety of interests, intellectual, physical and moral, in all types of schools and at all levels of ability.

3. Research Evidence from the United Kingdom

The evidence from America and Europe indicates that it is possible to isolate patterns of vocational and educational interests and that measured interests are much more stable than has been popularly assumed even at the beginning of the secondary school career. It would appear to be possible, therefore, to use interest scores for the purpose of predicting success in careers and courses of education within broad limits. However, in the American reports was presented a plea for the provision of greater information about careers whilst those from Europe indicate that variety rather than specialisation should characterise the syllabus of secondary schools. It now remains to see whether these conclusions, and the techniques from which they are derived, are applicable to British conditions.

(*a*) *Components of the guidance procedure*

The mobilisation of great numbers of men and women for war-time work concentrated the attention of research workers upon the techniques of guidance and selection. Although the problem was essentially vocational in nature the work holds important implications for educational advisers.

One of the main summaries of this work is that of Vernon and Parry who used measurements of interest as well as of general and special abilities and skills in their selection procedures. In their work the authors used interviews, questionnaires, inventories and tests and assessed the place these components should be given in the selection scheme.

They found evidence which confirmed Fryer's conclusion that little reliance could be placed upon the interview for the purpose of selection. In a later report Vernon summarised the evidence of other research workers which supported this view in the illustration that if two interviewers working independently are asked to select 20 candidates for a grammar school from 100 applicants on their judgment alone they will agree only on 9 and will disagree on 11.

The two authors considered, however, that the interview could form an important component of guidance if certain precautions were taken. The interviewer should be experienced in his work and should be provided with full information about the tasks sought by the candidates. This should cover the physical and social aspects of the work as well as the operations to be performed in undertaking it and should involve as little use as possible of generalised characteristics such as " concentration " and " dexgerity." If traits such as these can be clearly defined they are better tested objectively, leaving the interviewer to assess personal traits not so readily covered by tests. The interview should be used to gain a clear picture of the candidate which is essential for a complete and true interpretation of data derived from isolated tests and questionnaires.

Vernon and Parry found that the usefulness of questionnaires was limited by the differences in candidates' judgments of what information is relevant and important. When asked to mark a list of activities which they had performed some candidates ticked nearly every item whilst others marked only those activities on which they had spent a lot of time or in which they had performed well. More objective measures were found to be necessary.

They considered the Strong and Kuder inventories to be of use both methodologically and in the conclusions reported. A test of the Strong type was developed and found to be a valuable instrument, but because of the difficulty of scoring and analysis it was not used on a large scale. It was also found to be of less value in the assessment of the leisure-time interests of less able adults than of their more able contemporaries. The leisure interests of a skilled instrument mechanic might resemble more closely those of an equally intelligent clerk rather than those of a less able worker in his own craft, and accordingly a satisfactory allocation using this criterion would be impossible.

Information tests were also used to select personnel for " practical " tasks. In one example, two such tests, of electrical and mechanical information, were given to groups of 300 naval radio mechanic trainees, 214 electrical mechanics and about 100 wiremen. Compared with other tests used, mainly of special ability and skill, the instruments appeared to be quite useful for when they are compared with the end-of-course result correlations were found to be 0.46, 0.46 and 0.36 respectively. In another scheme mechanical ability and interest tests were given to a group of 300 boys training to be fitters, armourers, masons, carpenters, electricians and instrument makers. Again it was found that interest tests of the Strong type, were useful supplements to the information provided by the ability scores.

The authors report with approval the advice given by Wilson about the value of interest measures in guidance procedures. He found that the relevant aspects of interests which should be covered by interviews, tests and questionnaires are their range, span, depth, stability, relationship with the proposed task, origin (to assess their permanence), and the degree to which the various interests reinforce or conflict with each other. He also found that the strength with which the interests were pursued was of great importance.

(*b*) *Factors Influencing Vocational Preferences*

Although much less relevant work has been done here than in the United States, the volume of work in Britain (in common with other European countries), has increased considerably since the end of the second world war. Again, recent conclusions tend to be more optimistic than earlier ones. Fryer's caution was supported in 1938 by Rodgers who, as a result of his work in giving vocational guidance to groups of secondary school pupils of both sexes found little evidence to justify the undue importance which parents and teachers attached to children's statements of interests. Stott confirms this conclusion. Over a period of fifteen years prior to 1941 she gave vocational guidance to over 1,900 girls and 600 boys, most of whom attended secondary schools, presumably of a selective nature, and were between the ages of 16 and 19 years.

It is reasonable to expect that by reason of ability, age and background these children should be realistic and well informed about their vocational preferences, but this was not evident in their statements. Girls were particularly unrealistic in their choice of a career, often striving to enter an occupation to succeed in which they themselves realised that they had neither the ability nor the qualifications. They also expected to reach high positions quickly and appreciated far less even than did boys that this was only possible after a long, arduous and often tedious training.

Both the writers attributed this to inadequate vocational information on the part of both children and parents. Stott in particular noted the great influence which the opinions of parents had upon the choices of their children. Sometimes these took the form of encouraging sons to choose jobs for which they were not suited and in which they had no real interest, and daughters to accept jobs which were well below their ability.

It is important to consider this problem further and in particular to study the factors which appear to be influential in disposing children to choose certain occupations from the comparatively wide range which is open to most of them and to assess the adequacy of secondary school children's knowledge about careers.

At about the same time as Stott's study, Lingwood investigated the adequacy and realism of the vocational information which was possessed by selective secondary school girls. For this purpose she took groups of 40 to 60 children in each age group from 13 to 16 years. A course of four careers lectures was given at the end of which girls were encouraged to ask questions about occupations. Before and after the course a questionnaire was administered in which the girls were asked to record the jobs which they liked best and to mark from a list the reasons for their choice, a procedure in which the advice of Valentine and Ritchie was followed. The information was checked for correctness of knowledge about preliminary qualifications, employment conditions and the nature of the chosen work.

Generally, younger girls were found to make wider but more fanciful choices and also appeared to absorb less information about careers than the older pupils. From the third year onwards the amount of detail which they could learn increased and there appeared to be a marked improvement in the correctness of their vocational knowledge. At the same time they abandoned the more fanciful careers as serious preferences.

The influence of the home upon their choice was strong and all girls accepted to some degree the advice of their parents. The school environment also emerged as an important factor in many ways. Many pupils wanted to become teachers, perhaps because it was the only career with which they had had a close contact, whilst others, who stated a preference for commerce and nursing were possibly influenced by school tradition, for many " old girls " had entered these occupations upon leaving school. Lack of ability was rarely mentioned as a barrier to entering a job but the expense of long periods of training discouraged many from choosing careers where this was necessary.

This research data supports popular opinion in pointing to the home and school environments as being the most important sources of interest stimuli affecting the vocational choice of secondary school children in this country. Perhaps of greater value to advisers will be studies of the manner in which choice is influenced by these agents.

Among the post-war investigations, one conducted by Jahoda in 1952 is important. He interviewed and gave a questionnaire to 56 boys and 77 girls in two secondary modern schools in an industrial district. Afterwards, he conducted a " follow-up " study with them once they had entered their first jobs. The home appeared as the most important influence but there occurred also significant differences in the attitudes of the parents to the vocational preferences of their children. Mothers were preoccupied with the careers of all their children, although their main influence was exerted upon their daughter's choice; on the other hand, fathers tended to help only their sons. Most parents appeared to be very tolerant and rarely tried to impose their views upon their children; when they did so it was mainly to warn against disadvantages rather than to point out advantages. Many did not give formal advice, although even with these their informal attitudes affected the choices which the children made.

The advice of parents was sometimes strongly supplemented by that of adult friends of the family and by contemporaries of the children who had recently left school to begin work. Hobbies, part-time jobs and other home factors were rarely mentioned as determinants of vocational choice by the children although much is sometimes built upon statements of these for the purposes of giving guidance.

Again, it was found that the school as an agent was next in importance to the home. The influence of the teachers appeared to be more subtle than direct and was greatest as the end of the school course approached. More outstanding was a liking or disliking for school subjects. The best-liked subjects, and therefore the most influential, for the boys were woodwork, metalwork and practical drawing, and for girls needlework, cooking and baking. Subjects such as English and Arithmetic were mentioned mainly because they limited choice; thus, poor spelling was considered to be a barrier to becoming a good secretary.

Visits to factories apparently were of little value in helping the children to choose careers. This may have been the result of having too few visits (on an average only 0.3 for boys and 1.1 for girls during the last year at school) and perhaps of poor planning whereby the visits took place after the children had chosen their careers.

The value and influence of the Youth Employment Officer's talks were also studied. These talks were given at the beginning of the penultimate term and were carefully organised. Of the children who attended, 46 per cent. of the boys and 52 per cent. of the girls mentioned them in their questionnaires as being a contributary factor to their occupational choice. Apparently the main value lay in widening the occupational horizon, discouraging unrealistic choices, focussing attention upon the main considerations by the pupil and parent and thereafter helping to narrow the choice from a general area to a specific job. Those who were not influenced had already chosen their careers. However, only 20 per cent. of the final jobs were accepted as the exclusive result of the Officer's advice. When the children's vocational knowledge was studied 20 per cent. were found to be well informed compared with 40 per cent. who knew little beyond the name of the job.

In general, there was no evidence that any two types of influences are associated although each child was, on average, influenced by between two and three factors, of which the order of importance appears to be parents, contemporaries and school activities.

One reason which may be advanced for Jahoda's conclusions is that the investigation was conducted in one particular type of school. However, two further studies by McGiffin in 1958 and Chown in 1959 found similar conditions obtaining in secondary grammar and technical schools of both sexes.

The first research worker gave a questionnaire to 254 fifth and sixth formers in two boys' Belfast grammar schools. He found that 197 had already chosen their careers and in general the choices appeared to be realistic when compared with their measured ability. When their vocational knowledge was assessed it appeared that although they had adequate general information about their immediate career only 18 per cent. were well informed about the working conditions of their chosen jobs compared with the 59 per cent. who were poorly informed.

The most popular occupations among the boys were: engineering, teaching, scientific work, medicine, the Armed Forces, agriculture, and the Church; whilst the most frequent reasons for their choice were recorded as being: an interest in the job, a good performance in the relevant school subjects, security of tenure and good prospects of promotion, an interest in " people " and good pay and hours of work. These choices, and the reasons for making them, appeared to be affected by three main agents of which the home was again the most powerful, especially when it actively encouraged the boys to take an interest in their future careers. This took the form of suggestions that the boys read books on careers and seek the advice of adult relatives and friends for details of their occupations and had the effect of widening their vocational horizons.

The agent next in importance was the school. Most of the choices had been made when the pupils were between 13 and 18 years of age, but the most popular time for making firm decisions was just before the secondary school external examination was taken at 15 years. It also exerted a more subtle influence in concert with the third factor, the opportunities for employment available in the locality. As was found in the last study the list of jobs preferred by the boys—and perhaps also the reasons for choosing them—are typical of those traditionally associated with grammar schools and regions of heavy industry.

Chown gave a questionnaire to 192 boys and girls who were attending four secondary grammar schools in different residential districts and also interviewed the parents as well as the children. When analysed this data was compared with three other sets of results: of Jahoda, derived from a study of secondary " modern " school children; of a group of children whose vocational knowledge was assessed in 1927 for its amount and accuracy; and the applicability of Ginzberg's theory of vocational development to British conditions.

The results of this investigation showed that Ginzberg's theory was applicable to the conditions of a British grammar school only in a very modified form, and that compared with the earlier group there had been little improvement in the amount of vocational knowledge which was possessed by the children. When compared with Jahoda's conclusions, however, differences were noticed. Although the home and school were still the two most influential factors on the pupil's choice of careers there was a subtle change in the balance of power. Chown's children were less influenced by parents, relatives, friends and out-of-school activities in general whilst the part played by teachers and performance in relevant school subjects were correspondingly greater. Girls in particular were active in seeking vocational advice from teachers. Perhaps this is caused by the parents' inability to give information about careers of an advanced technical nature which is beyond their range of experience.

Sex differences in vocational choice have been noted by several of the above writers and it may be of value to assess the research evidence about one explanation which is often given. The choice of a girl's career is generally considered to be strongly influenced by her hopes of marriage. Stott found that because of this expectation parents often treated the aspirations of daughters with less seriousness than that of sons. In part she considers that this attitude of the parents encourages girls to choose rather fanciful jobs, in which they expect rapid promotion, often as a result of turning to women's magazines as sources of information. It may also help to explain the reason why girls are willing to choose the jobs of their more favoured brothers whilst boys rarely prefer those traditionally associated with women.

More factual evidence comes from a recent study by Gallagher who gave a questionnaire to a group of 190 girls who were leaving the secondary technical and grammar schools of Wallasey. A " follow-up " study of some of the girls was also made.

Of this group, 50 per cent. were married or engaged within six years of leaving school whilst nearly all hoped for this to happen before becoming 28 years old. It is not surprising, therefore, that 74 per cent. left school before they had completed a sixth form course. This represents a considerable loss of talent for the community and of valuable experience to the girls. Although the school-leavers realised this and were often dissatisfied with their jobs few were willing to seek advancement through further study for more than one-third considered further vocational training to be of no value to women and less than 50 per cent. accepted jobs which required it. In general, 75 per cent. of the group intended to leave work when they married and of the 67 per cent. who were found to be ambitious only 22 per cent. had taken constructive measures to further their aspirations.

(*c*) *Educational Guidance*

Much of the war-time work on measurement techniques was conducted with older people and was mainly vocational in character. In recent years tests which are simple to administer and efficient have been developed in this country for use in schools. Although originally developed for the 11-year-old age groups they have also been used successfully with older children and could form a valuable component for guidance within the school when, for example, children are guided to different specialist courses at the age of 13 years.

Fleming has developed a test (P.A.I.) designed to assess the preferences of school children for objects, ideas or people which has been used to guide children to courses with technical and other types of bias. The items are presented in the form of statements which are grouped under the following nine headings: " Knowing your own mind," " Talking about wishes," " Judging other people," " Choosing Work," " Spending Money," " Using one's hands," " Being with other people," and " Talking about School." Taking each section separately the children are asked to mark four statements which vary from the one considered to be most sensible to the one with which there is no agreement. The last section is entitled " Keeping a Record " and lists forty activities on which children have been found to spend time. The respondent is asked to mark those activities which have been undertaken in the previous fortnight together with those which the child would like to have done.

Another frequently-used test in this country is the Wiseman-Fitzpatrick " Devon " Interest Test, separately developed for boys and girls and yielding both " practical " and " academic " scores. The respondents are asked to read groups of six activities mainly related to their everyday life, and to indicate whether these activities are liked, disliked, not undertaken or unknown. In addition, the first and second strongest " likes " are recorded. In each panel of six activities there is a strong " distractor," for example, " playing football " or " going to see an exciting film." This was found to be highly discriminating and especially indicated pupils with a " practical " bias strong enough to take precedence over the " distracting " activity.

Lambert and Peel have also developed a test to distinguish between children who would be best advised to opt for either a broadly academic or technical curriculum. In form it is an information test which is divided into three main sections. The first makes use of the multiple choice response whilst the second is an " open " word association test. On these two parts the pupil is asked to choose between " academic " and " practical " items known by previous statistical analysis to be of equal difficulty. In the third section the pupil has no choice and is required to answer both " practical " and " academic " items. Hence the first two sections give measures of bias towards either " practical " or " academic " interests whilst the third section assesses the level of interest in terms of actual knowledge of types both of pursuit.

By the use of the last two instruments valuable evidence has thus been reported about the development of boys' and girls' interest in " practical " and " academic " studies.

The Lambert-Peel General Information Test, together with tests of practical and academic ability and attainment, were administered to the top 30 per cent. of ability of the 11 + year age group throughout the county of Northumberland. The total sample numbered 481 boys drawn from rural, urban and industrial areas. The original test data showed that the bias of interest on the part of the whole group was towards an academic curriculum. When 103 were re-tested after one year in their secondary schools and a similar group was tested after yet another year it was found that this academic bias had changed significantly towards the technical curriculum. This change took place at all levels of original interest and in both grammar and secondary modern schools.

No statistically significant difference was found between the mean scores of the rural, urban and industrial groups. However, there was one interesting and highly significant result. The scores of the children from industrial areas reflected the fact that they had acquired technical information from their environment to the same extent as academic information (as shown by their responses to the third part of the test), although in fact their replies to the first two parts showed that many of them still did not choose practical to the same extent as academic items when given the choice.

Sometimes the suggestion is made that able children, as measured by tests of verbal ability, are better served by an academically biased curriculum. The scatter of interests throughout the whole range of this top 30 per cent. of ability does not justify this assumption. In general, there was a marked degree of individual difference noticeable in both practical and verbal ability scores and measures of interest, the I.Q.'s ranging from 144 to 108 and the bias of interest varying from —83 to +41, where the total possible, academic and practical, scores are —100 and +100 respectively.

Finally, the relationship between success in various school subjects and the practical scores was studied. No technical schools were provided in the county and because of their numbers secondary modern schools only received small groups of the children included in the sample so that the study took place in three grammar schools, one being drawn from each of the three areas noted above. A measure of the children's attainment in school subjects was obtained by means of a conversion chart prepared by the Local Education Authority to standardise the marks of the different schools and teachers. Taking six subjects taught at this junior level it was found, as might well be expected, that the subjects which showed the closest relationship with the practical score was woodwork and, in decreasing order, art, science, mathematics, English and French. These results can only be tentative as the total number of children involved in this part of the study was only 60; however, it points the way for further study with larger samples in other types of schools and with older pupils.

In the research programme of the National Foundation for Educational Research problems of educational guidance are being studied at the secondary school and technical college level. In 1954 a " pilot " study began with groups of 42 boys and 52 girls drawn from two single sex technical schools in an industrial town. Batteries of tests were given to the children when they first entered the school at 11 years of age and two years later.

Both batteries included tests of general and special abilities as well as the Lambert-Peel General Information Test and the Wiseman-Fitzpatrick " Devon " Interest Test.

When compared with teachers' assessments of performance in class subjects taken in 1958 neither of the two interest tests given at either administration appeared to have significant predictive value, the one coming nearest to significance being the practical score of the General Information Test. However, it should be pointed out that the samples are small and that teachers' assessments are probably too subjective to provide a valid criterion by which the scores of objective tests can be judged.

N.F.E.R. INTEREST TEST SCORES (MEANS AND STANDARD DEVIATIONS)

Test	Year	Boys (N=41)		Girls (N=55)	
		Mean	S.D.	Mean	S.D.
General Information:					
Practical	1954	8.29	3.72	3.96	2.19
Academic	1954	13.02	3.43	12.75	3.03
Practical	1956	15.59	5.84	5.13	2.04
Academic	1956	16.63	4.28	17.27	3.63
" Devon ":					
Practical	1954	18.34	11.08	16.36	7.06
Academic	1954	8.59	5.90	8.55	6.58
Practical	1956	15.61	10.10	13.75	6.28
Academic	1956	8.61	4.93	8.27	5.70

Source: N.F.E.R.

Of greater value is the data which is derived from a comparison of the average, or mean, scores for each test and sex. Measured by the General Information Test at 11 years of age the mean scores on the academic items are higher than those on the practical items for both boys and girls. On the " Devon " Interest Test, however, the opposite result was obtained. Probably this reflects the different purposes of the tests: the first measures interests by the amount of knowledge and the second records the likes or dislikes of children for certain activities. It is not surprising to discover that children prefer practical to academic activities at this age, nor is it unexpected to find that their academic knowledge is greater than their practical information since the influence of the primary school is often mainly academic and strong at this age.

The discovery that 11-year-old boys have greater " practical " information than the girls is not unexpected, particularly when the nature of the test items is considered. The practical items are derived from simple crafts and sciences such as woodwork, mechanics and electricity which are more associated with boys' than with girls' leisure time activities. In fact, the test probably reflects the change of emphasis in technical education at the secondary school level from a narrow trade training for boys to a broader, vocational education equally suitable for girls. On the other hand it is intriguing to note that on the " Devon " test girls expressed as strong a liking as boys for practical activities and preferred them to academic pursuits.

Two years later, at 13 years of age, the level of the mean academic and practical scores for both sexes has increased. There is very little difference between them on the academic scores but the gap between the practical scores has widened considerably in the boys' favour. This gives support to the views expressed above about the influence of the test items. However, even at this age, girls still prefer practical to academic activities and this remains equally as strong as that of the boys.

The cause may, perhaps, be found in the technical content of their schools' curriculum although it should be borne in mind that it is often the practice in our secondary schools to give a " general " education during the first two years in which any bias towards technical studies is slight. It may also be the result of an efficient post-primary selection procedure whereby girls of permanent " practical " bias were successfully allocated to a secondary technical school despite the fact that the " 11 + " interest score did not predict later teachers' assessments.

It has already been noted that the Dutch report has pleaded for the provision in that country of a greater variety of courses for girls of below average ability and it is pertinent to ask whether this plea should not be extended to all girls in this country. Of course, much more evidence is needed before this conclusion can be accepted as being final. However, some important confirmatory evidence comes from another research study of the National Foundation.

This was undertaken at West Hatch, a selective secondary technical school which is in a mixed residential area. During their first year at school 95 boys and 105 girls were given tests of general and special ability as well as the Fleming P.A.I., " Devon " Interset and the General Information Tests. As the study has only begun recently only results from the last two of the interest tests are available for the 11 +-year-old children.

On the " Devon " Interest test there was a definite bias towards practical activities which is significant for both boys and girls, and especially so for the boys who score much more highly. There is no significant difference between the two sexes on academic scores. On the General Information Test practical and academic scores have not been considered separately and only the general bias towards one or the other can be given. This shows that there is a great difference between the scores of the two sexes, with the girls biased very heavily towards the academic items whilst the information which boys appear to have gained from practical and academic sources appears to be balanced equally. This is in general agreement with the data derived from the Northumberland study reported above although the West Hatch boys have not responded to the "academic" items as strongly.

To test the effects of differences of ability on the scores of the interest tests, the verbal ability scores of boys and girls were divided into three groups and the interest scores of the top and bottom thirds of ability were compared. No great deviation from the pattern described for the whole group appeared although the " Devon " practical score for boys of low ability appears to be higher than for those of high ability whilst on the General Information test there is a difference between boys of high and low ability, the former appearing to have gained more academic knowledge whilst the latter show no bias in either direction.

Conclusion

Formerly, opinion has been sharply divided between those who hold that interests only affect personal satisfaction and others, often teachers and parents, who have placed too much reliance upon expressions of interest. During the last generation the boundary zone between the two groups has been narrowed by the evidence which testifies to the existence of educational and occupational interest patterns and shows that the measured interests of adolescents are sufficiently permanent, depending upon their age, to be used for the purposes of secondary school and vocational guidance. For these tasks a few instruments have already been developed in this country, although more are needed. However, two strong warnings must be given. Measurements of interests must only form part of the guidance procedure supplementing but not replacing, for example, tests of general and special abilities. Also it is important to accept the measured bias of a child's interest only as a general disposition to choose to study or enter a group of educational courses and careers, because interest as exhibited by the act of choice, may be greatly influenced by the wealth of information and other stimuli which exists in the home and school. In many cases it will be the task of the school to supplement the home's deficiency in this respect.

Bibliography

BENTON, A. L. and KORNHAUSER, S. I., " A Study of ' Score Faking ' on a Medical Interest Test." *J. Ass. Amer. Med. Coll.*, 23, 57-60, 1948.

CHAUDAGNE, H., " Un questionnaire d'interets pour garcons de 13 a 16 ans." *Bull de l'inst. Nat. d'orientation Professionelle*, 218-223, 1952.

CHOWN, S. M., " The Formation of Occupational Choice among Grammar School Pupils." *Occ. Psych.*, Vol. 32, No. 3, 171-183, July, 1958.

CHOWN, S. M., " Personality Factors in the Formation of Occupational Choice." *B. J. Ed. P.*, Vol. XXIX, Pt. I, 23-34, February, 1959.

DARELY, J. G. and HAGENAK, J., *Vocational Interest Measurement*. Minneapolis, 1954.

FLEMING, W. G., *The Kuder Preference Record—Vocational as a Predictor of Post-High School Educational and Occupational Choices*. Toronto: Ontario College of Education, 1959.

FITZPATRICK, T. F. and WISEMAN, S., " An Interest Test for Use in Selection for Technical Education." *B. J. Ed. P.*, Vol. XXIV, Pt. II, 99-106, June, 1954.

FRYER, D., *The Measurement of Interests*. London: Harrap, 1931.

GINZBERG, E., *Occupational Choice: An Approach to General Theory*. London: O.V.P., 1951.

IRLE, M., *Berups Interssen Test*. Gottingen, 1955.

Jahoda, G., " Job Attitudes and Job Choice Among Secondary Modern School Leavers " (I). *Occ. Psych.*, Vol. XXVI, No. 3, 125-141, July, 1952.

Jahoda, G., " Job Attitudes and Job Choice Among Secondary Modern School Leavers " (II), *Occ. Psych.*, Vol. XXVI, No. 4, 206-225, October, 1952.

Kuder, G. F., *Preference Record: Vocational.* Chicago, 1939.

Kuder, G. F., *Examiner Manual for the Kuder Preference Record.* Chicago: Science Research Associates, 1949.

Lambert, C. M., " Symposium on Selection of Pupils for Different Types of Secondary Schools, V. 11. A Survey of Ability and Interest at the Stage of Transfer." *B. J. Ed. P.*, Vol. XIX, Pt. II, 67-82, June, 1949.

Lingwood, J., " The Vocational Information Possessed by Secondary School Girls." *Occ. Psych.*, Vol. XV, No. 4, 185-199, October, 1941.

McGiffin, S. J., " Factors Influencing the Choice of Careers by Boys in Two Belfast Grammar Schools." *B. J. Ed. P.*, Vol. XXVIII, Pt. II, June, 1958.

Miller, K. M., *Manual for the Rothwell Interest Blank (Miller Revision).* Melbourne: Australian Council for Educational Research, 1958.

Peel, E. A., " Assessment of Interest in Practical Topics." *B. J. Ed. P.*, Vol. XVIII, Pt. I, 41-48, February, 1948.

Reeves, J. W. and Slater, P., " Age and Intelligence in Relation to Leisure Interests." *Occ. Psych.*, Vol. XXI, No. 3, 111-125, July, 1947.

Rodger, A., " Vocational Guidance: A Review of Some Doubts." *Occ. Psych.*, Vol. XII, No. 3, 187-196, Summer, 1938.

Rubenowitz, S., " Predicting Academic Success." *Occ. Psych.*, Vol. 32, No. 3, 162-171, July, 1958.

Stott, M. B., " Occupational Success." *Occ. Psych.*, Vol. XIII, No. 2, 126-141, April, 1939.

Stott, M. B., " Some Differences between Boys and Girls in Vocational Guidance." *Occ. Psych.*, Vol. XIX, No. 3, 121-132, July, 1945.

Strong, E. K., *Vocational Interests of Men and Women.* London: O.V.P., 1943.

Strong, E. K., " Permanence of Interest Scores over 22 years." *J. of Applied Psych.*, 35, 89-91, 1951.

Strong, E. K., " Nineteen-year Follow-up of Engineer Interests." *J. of Applied Psych.*, 36, 64-74, 1952.

Strong, E. K., *Vocational Interests 18 Years after College.* Minneapolis: University of Minneapolis Press, 1955.

Super, D. E., *Appraising Vocational Fitness.* New York: Harper, 1949.

Super, D. E., " A Theory of Vocational Development." *American Psychologist*, Vol. 8, May, 1953.

Super, D. E. and Bachrach, P. B., *Scientific Careers and Vocational Development Theory.* New York: Columbia University Press, 1957.

Valentine, C. W. and Ritchie, F. M., " An enquiry as to the reasons for choice of occupation among secondary school pupils." *Forum of Education*, 5, 85-101, 1927.

Vernon, P. E. and Parry, J. B., *Personnel Selection in the British Forces.* London: U.L.P., 1949.

Wechs, S. C., *An Investigation of the Relation between Age and Vocational IYterests as measured by the Rothwell Interest Blank.* Unpublished B.A. Thesis, University of Tasmania.

Wiegersma, S., *Interesse en schoolkeuze.* Leiden, 1959.

Wilson, M. D., " The Vocational Preferences of Secondary Modern Schoolchildren," Pt. I. *B. J. Ed. P.*, Vol. XXIII, Pt. II, 97-114, June, 1953.

Wilson, M. D., " The Vocational Preferences of Secondary Modern School Children," Pt. II. *B. J. Ed. P.*, Vol. XXIII, Pt. III, 163-180, November, 1953.

THE EFFECTS OF STREAMING

by ALFRED YATES and D. A. PIDGEON

IN the majority of large urban junior schools and in many secondary schools, children within the same age group are assigned at the beginning of the course to different classes according to their levels of general ability or of attainment in the basic subjects. This practice has been justified on the grounds that teachers can deal more effectively with relatively homogeneous groups of children than with those comprising pupils who manifest markedly different educational needs. Children of all levels, from the gifted to the dull, it is argued, benefit from an arrangement whereby for each class a rate of progress can be determined which is closely related to the pupils' capabilities.

A further—and necessary—justification for the practice of streaming is that, during the period of the junior school course, the relative levels of performance of the children remain fairly stable. Evidence has been obtained from a number of surveys which suggests that, in the main, primary school teachers believe that a coarse grouping of children into two or three categories is a feasible procedure. In other words, their experience has shown that, although some progressive re-ordering of the groups may be necessary, children can be satisfactorily allocated at or near the beginning of the course to groups that remain fairly homogeneous. In the majority of schools the streams are not equal in size. The general practice is to arrange small classes for the weakest pupils so that they can be given a considerable amount of individual attention.

Criticism of streaming

The practice of streaming in junior schools has recently been criticised, chiefly on the grounds that it may well result in a lowering of the morale and consequently of the achievements of those children who are assigned to the " C " streams. In a letter to the *Times Educational Supplement* (29th July, 1955), Mr. John C. Daniels, of the Nottingham University Institute of Education, stated that he had collected evidence to show that whilst children in the A stream of a junior school increased their measured I.Q's by an average of 7.4 points, those in the C stream decreased their average score by 12.3 points. Mr. Daniels, as far as we are aware, has not published the details of this investigation, nor of his subsequent inquiry, to which he referred in his letter, into the relative progress in attainments of pupils in different streams. Nevertheless, the suggestion that streaming may serve to perpetuate or even to intensify the initial differences on which it is based is now frequently made. The purpose of this brief note is to summarise the researches that have been undertaken into the effects of streaming in order to assess the validity of these criticisms.

The evidence of research

(*a*) *American investigations*

In discussing the findings of American investigations into the effectiveness of ability grouping, French writes: " While there are a few recent studies in this area much of the experimental work is more than twenty years old. This does not appear to mean that the problem was settled twenty years ago, because the results of studies carried out in the twenties and thirties were conflicting. Different experimental designs, different tests, different teaching methods, and different learning materials all contributed to a confused situation."

French's own investigations, based on school records, did not serve to clarify the situation. He compared the achievements of classes grouped by ability with other more heterogeneous classes in the same high school. He found no significant relationship between achievement and the degree of homogeneity within the classes concerned. In other words, he found no evidence either in favour of or against the practice of streaming. He concludes his report by despairing of the possibility of resolving this issue by what is usually referred to as " operational " research (i.e. examining a situation as it exists—e.g. comparing streamed schools with unstreamed schools) on the grounds that in these circumstances it is impossible to ensure that appropriate teaching methods are being applied and with equal effectiveness, to all the groups of children concerned. He makes a plea, therefore, for " action " research, in which an experimental situation is contrived, allowing for the control of irrelevant variables and an adequate comparison between the progress and attainments of children who are streamed and those who are taught in randomly assorted groups.

Another example of American work in this field is the investigation of Breidenstine, who compared the educational quotients of children in four schools in which streaming was carried out with those in seven schools in which no such differentiation was made. He found little difference between the groups, although he reports a slight tendency for duller pupils to fare best in the streamed schools. Unfortunately, the design of this, and a number of other early investigations, does not provide an answer to some of the more pertinent questions that one would wish to ask. For example, it is relevant to discover not only the differences between the average levels of performance between streamed and unstreamed groups but also the differences between the variances or " spread " of the scores. This latter measure would indicate the extent to which streaming serves to widen the differences between the abilities and attainments of pupils, as some of its critics suggest that it does.

A survey of the experimental studies of homogeneous grouping in the United States has been provided by Ekstrom (1959). She reports thirteen studies favouring homogeneous grouping, fifteen reporting no differences in achievement in homogeneous or heterogeneous groups, or which found homogeneous grouping detrimental, and five studies which gave mixed results.

Not only is the research carried out in the United States inconclusive, but it is also concerned with a situation very different from that in our own schools. What has been investigated in the researches referred to above is the effects of grouping by ability within grades. Since the grade system involves the promotion of those who have reached a given standard and the repetition of grades by those who have failed to do so, this grouping by ability does not concern a single age group as in the schools in this country.

(*b*) *Research in the U.K.*

We have been able to discover only two sizeable investigations into the effects of streaming in this country.

Rudd studied the progress of two groups of eleven-year-old children in a London Central School. The experimental group consisted of ninety pupils divided into three streams on the basis of their performance in the eleven-plus examination. In accordance with the practice adopted in the school these children were regrouped after each half-yearly examination in order to ensure that the streaming was kept in line with the children's attainment.

The control group consisted of an equal number of children who were similarly divided into three groups when they entered the school but who were allowed to remain in the same classes throughout the first two years of the course. At the end of this period a considerable amount of regrouping took place amongst the children in this age group.

Tests of general ability and of attainment in arithmetic and English were given to all the children and comparisons made between the control and experimental groups and, within these groups, between those children who were transferred at some stage from one class to another and those who remained in their original class. Attempts were also made to measure the children's attitudes towards examinations and school work and to measure a number of personality variables.

The results of the tests of ability, attainments and attitudes revealed no significant differences between the groups. The author reports that " the samples of classroom behaviour revealed that where the organisation was based on streaming fewer social contributions to lessons were made by pupils, whilst there was more aggressive behaviour and less attention to work." These latter conclusions, however, were based on subjective assessments of the children's behaviour in the classroom.

This investigation suffered from a number of limitations. Only one school was involved and, moreover, the children concerned, having been selected for a central school on the basis of their scores in the eleven-plus examination, did not differ markedly in ability or attainment.* Furthermore, nothing in these circumstances could be done to control or to allow for differences in effectiveness between the teachers.

A more extensive investigation has been carried out by Blandford. This involved the analysis of the scores derived from tests administered to 1,700 pupils drawn from twenty-four primary schools in the area of a large county authority. The battery of tests comprised five tests of attainment and an intelligence test consisting of both verbal and non-verbal items. The tests were given on four occasions (parallel forms of the tests were used alternately) when the average ages of children were approximately 8, 9, 10 and 10½.

A comparison was made between the results obtained in those schools which had three or more streams and another group in which the number of children in the age group concerned was just sufficient to form one class. Two hypotheses were examined. First it has been suggested that streaming tends to preserve the differences between pupils' rates of progress and levels of attainment. If this were so, one would expect to find that the correlations between the test scores near the beginning of the course and those a year or two later would be higher in streamed than in unstreamed schools. This was not borne out by the results of this investigation. Only one of the correlations reached a moderate level of significance and even this disappeared when due allowance was made for the fact that the spread of scores was smaller in the unstreamed than in the streamed schools.

---

*The children selected for central schools in London at the time when this investigation was carried out were those who, in the examination list, came below the pupils who qualified for grammar school places, but higher than those allocated to modern schools. Thus, they all belonged to the " borderline " group.

The second hypothesis examined in this analysis was that the gap between children's levels of ability and attainment tends to be widened as a result of streaming. In order to test this hypothesis a comparison was made between the spread of scores in the streamed schools with that in the unstreamed schools. A highly significant difference was found in the case of the attainment scores, but the difference with respect to the scores in the intelligence test did not reach a statistically significant level. Thus, no support was found in this investigation for the conclusions reached by Daniels (see above).

Further evidence which may have a bearing on the effects of streaming has been provided in this Journal by Pidgeon. In reporting the results of a comparative survey of the attainments in reading and arithmetic of eleven-year-old children in England and Wales, Queensland, Australia, and Central California, Pidgeon shows that in all the tests administered the standard deviation or spread of the scores was significantly larger for the children in this country than for those in Queensland, where the grade placement system is employed. This investigation also revealed that in reading, not only was the mean score higher in England and Wales, but there were fewer " poor " readers. In arithmetic, however, although the mean scores were the same for the two countries, England and Wales produced more " poor " arithmeticians and there was other evidence to suggest that in this subject the Queensland children were superior. Thus, although this study supports the view that streaming may result in a widening of the gap between children's levels of performance, it offers no conclusive evidence that it results in either superior or inferior attainment.

The evidence from this comparative study must, however, be reviewed with caution. The comparison made was not between streaming as practised in this country and not streaming, which is the real issue we wish to investigate, but between the eduactional system practised in England and Wales, which includes streaming, and the grade placement system employed in Queensland, Australia. Now there are many differences between these two systems apart from the factor of homogeneous grouping which may have influenced the results obtained, not least among which is the fact that, because of our examination system and indeed for other reasons, teachers in this country are motivated to extend every child to the limits of his ability, whereas in countries employing the grade system, such as Australia, the class teacher's main objective is to get *all* children over a common hurdle—the syllabus for the grade. This latter system must necessarily result in greater homogeneity but whether it results in an overall raising of attainment levels can only be determined from empirical investigations. However, it is important to note that comparisons of this kind will not produce evidence to show whether streaming or not streaming is the better practice within our present educational system.

Discussion and conclusions

It is clear from this review of the sparse research that has been devoted to the problem of streaming that it is possible neither to justify the criticisms that have been levelled against it, nor to prove that streaming is a desirable and effective form of organisation.

In discussing his investigation, Blandford reaches the same conclusion as that drawn by French. He stresses the need for controlled investigations of the " action " type. The weakness of Blandford's research—as he himself points out—is that it involved a comparison between large streamed schools, mainly to be found in urban areas, with small unstreamed schools which for the most part are in rural areas. For a just comparison it would clearly be necessary to compare schools of the same size, serving similar catchment areas in some of which the children were assigned to streams in the usual way whilst in others they were divided at random into groups of mixed ability. Such an investigation needs to be done on a sizeable scale in order that due allowance may be made for differences in the quality of teaching.

The conditions necessary for carrying out such an investigation may well exist in various parts of the country. If a sufficient number of authorities and schools are interested to co-operate in such an inquiry the Foundation's staff would be willing to organise it and to analyse and report the results.

References

DANIELS, J. C.. " Streaming in Junior Schools—Effect on I.Q." Letter in *Times Educational Supplement*, 29th July, 1955.

FRENCH, J. W., " Evidence from school records on the effectiveness of ability grouping." Educational Testing Service, Princeton, New Jersey, March, 1959.

BREIDENSTINE, A. G., " The educational achievement of pupils in differentiated and undifferentiated groups." *Journal of Experimental Education*, Vol. V, No. 1, 1936.

RUDD, W. G. A., " The psychological effects of streaming by attainment with special reference to a group of selected children." University of London M.A. Thesis, 1956.

BLANDFORD, J. S., " Standardised tests in junior schools with special reference to the effects of streaming on the constancy of results." University of London Thesis, 1957.

PIDGEON, D. A., " A comparative study of basic attainments." *Educational Research*, Vol. 1, No. 1, November, 1958.

EKSKROM, R. B., " Experimental Studies of Homogeneous Grouping." Educational Testing Series, Princeton, New Jersey, April, 1959.

Abstracts:

SOCIOMETRIC ANALYSIS IN A RESIDENTIAL TRAINING COLLEGE

Ph.D. Thesis, University of London, 1958

by J. Cornwell

The Research Problem

THE research problem was to construct, refine and validate a sociometric test for prediction of final performance as measured by total course results in a two-year, six-term residential training course for men teachers. Furthermore, to facilitate subsequent diagnostic and counselling procedures, prediction was needed at the beginning of the second term, and test results must not only show substantial correlation with the Criterion, but must also prove particularly indicative of the bottom quartile of Criterion performance, and discriminate significantly between the third and fourth quartiles.

A near sociometric test of slightly modified Moreno pattern with multiple criteria concomitantly applied was chosen as the predictor with which to experiment, because, though other forms of peer nomination had been used for prediction in similar situations, there seemed to be no previous example of the application of systematic long-term refinement procedures to Moreno type criteria as a basis for prediction of teaching success.

It will be useful at this stage to explain very briefly what is meant by a near sociometric test of Moreno pattern with multiple criteria. The essential features of this type of test are as follows. It usually requires the individual to choose (sometimes also to reject) other individuals from amongst the members of his group as associates for specific and clearly defined purposes. These purposes are called ' criteria '. They provide the basis for the process of choice. When it is actually intended to put the criteria into action in the immediate future, they are ' real ' criteria. When the purpose specified is hypothetical (' *If* you were asked to choose . . .'), with no subsequent action intended, the criteria are ' near '. The criteria used may involve individuals in choices for official work-time groupings or for informal leisure groupings. The former are termed ' sociotelic ', the latter ' psychetelic '. A test with multiple criteria, that is, one which requires the participants to choose associates for a number of quite separate purposes, usually includes both types. All criteria, whether near or real, sociotelic or psychetelic, should be strong criteria: that is to say, they should provide the choosers with adequate motivation for making genuine and spontaneous choices and should be relevant to the special function of the group concerned. The choices made provide the basis for the study and measurement of inter-personal relations between group members and for the analysis of group structure.

Underlying Hypotheses

Certain hypotheses underlay the use of a sociometric test as the predictive measure. First, that since education was essentially a matter of inter-personal relations a student's success as a teacher, and correspondingly his success in a course of teacher training, would be related to his effectiveness in inter-personal relations. Secondly, that a student's effectiveness in inter-personal relations with his peers in a residential community would be prognostic of his effectiveness in inter-personal relations with children. Thirdly, that the most appropriate techniques for measuring this effectiveness were sociometric, and that the data so obtained would provide a basis for prediction of success as valid as, or more valid than, non-sociometric techniques already in use. Fourthly, that peer ratings sociometrically derived would provide early in the course prognostic data as valid as that derived later in the course from the ratings of superiors, and would therefore be especially valuable for early diagnosis.

Degree of Randomisation

The research involved the construction, refinement and validation of the sociometric test, but not its standardisation. Therefore, little degree of randomisation can be claimed for the results. The 250 students concerned belonged to three consecutive year groups (of 94, 83 and 73 respectively) from the same training college for men teachers and probably provided a fairly representative sample of students attending this college in the present decade. It cannot be claimed, even though it may be considered very probable, that they are representative of male training college students in general, still less of all training college students, since the majority of these are women. Further, the external Criterion used was specific to a particular University Institute of Education. It is true that the examination schedules of other Institutes are fairly similar. Nevertheless, the conclusions from the present research cannot validly be generalised beyond the context in which they were evolved.

Experimental Procedure

The first step in the experimental procedure was the construction of an over-size sociometric test consisting of five sub-tests, each sub-test containing four criteria, making twenty criteria in all. From this over-size version it was hoped by experiment to produce a refined version of about one-third the length.

Individual sub-tests differed in aspect of orientation to the composite Criterion of total course performance. Thus, the first sub-test contained criteria designed to orient choices towards individuals possessing leadership qualities of the kind one associates with successful headmastership, whereas the second was oriented more specifically towards teaching skill. The third was designed to attract choices towards the intellectually able, the fourth towards those attractive as leisure-time companions and the fifth towards those desirable as co-workers.

Though the criteria comprising each sub-test had a common aspect of orientation to the Criterion they used different choice situations. In this way the sociometric test was designed to probe in a variety of choice situations any orientation of sociometric status likely to be significantly related to the Criterion.

Thereafter, the aim of the main experimental design may be summarised as progressively to step back the prediction time base from the sixth term to the second term of the two-year course, at the same time systematically refining the sociometric instrument, in the hope that loss of predictive efficiency caused by lengthening of the prediction-Criterion interval on the one hand and lessening of degree of acquaintance on the other, would be offset by an increase in efficiency resulting from systematic refinement of the test.

Techniques of Analysis

The test was refined through three test versions, being reduced from twenty criteria to six criteria in the process. Each student year group was tested twice and Criterion performance was predicted from sociometric data obtained in every term except the first. Comparisons of predictive efficiency were made not only between earlier and refined test versions but also between near (hypothetical) and real (to be acted upon) data, positive (acceptance) and negative (rejection) data, and weighted and unweighted choices (i.e. between scoring which took account of level of choice preference and scoring which ignored it). A study was also made of the attitudes of students to requests for negative sociometric choices, and near and real criteria were compared in this respect.

In addition to rank order correlations with Criterion performance, the predictive efficiency of each test version was further investigated for capacity to discriminate between the third and fourth quartiles of performance. The Mann-Whitney U Test was chosen for this purpose as the non-parametric statistical technique most appropriate here for investigating the significance of the difference between two independent samples. Another non-parametric test, the Wilcoxon Matched-Pairs Signed Ranks Test, was frequently used to test the significance of differences in bottom Criterion quartile performances on test versions undergoing comparisons when two related samples were involved.

In item (i.e. criterion) analysis the phi coefficient was used for assessing the validity of different criteria by comparing the scores on each criterion of the top and bottom quartiles of the Criterion performance distribution. Chi square was used for the test of the null hypothesis and establishment of the significance of phi coefficients.

In addition to this consideration of their predictive efficiencies, criteria were also scrutinised in respect of volume and diffusion of sociometric response elicited, the former as indicative of their relative strength and attractiveness to the choosers, the latter as indicative of the degree to which they caused choices to be spread over a range of different individuals. As a result of this three-fold analysis six criteria were eventually selected for retention in the final test version. Finally, a comparison was made between the sociometric predictor and some available non-sociometric predictors, namely, an intelligence test, academic examinations and tutors' ratings.

Final Test Version

Instructions

Consider separately and carefully each item below, and for each one write down:

(*a*) the names of not more than five students of your year *most* acceptable to you in the role described;

(*b*) the names of not more than five students of your year *least* acceptable to you in the role described;

If you do not wish to nominate as many as five students for a particular role you may nominate less than five. You are, of course, permitted to nominate any student for more than one role, if you wish. Be responsible and deliberate in your choices. Do not nominate yourself!

1. As a member of your teaching staff if you were a Headmaster.

   (*a*) ....

   (*b*) ....

2. As a College Representative in an inter-college Brains' Trust.

   (*a*) ....

   (*b*) ....

3. As your partner in a group engaged in an investigation.

   (*a*) ....

   (*b*) ....

4. As a teacher of a class containing a child of yours.

   (*a*) ....

   (*b*) ....

5. As one of the 'Best Read' students in College.

   (*a*) ....

   (*b*) ....

6. To share with you the responsibility for a School Camp.

   (*a*) ....

   (*b*) ....

(NOTE : For the purposes of research, negative choices in the form of nominations of individuals *least* acceptable to the chooser were asked for in the test version above. However, positive choices alone were found to provide a significantly better basis for prediction than positive and negative choices combined. Negative choices provided additional data of diagnostic value, but whether this balances the resentment sometimes caused by asking for them is doubtful.)

Summary of Conclusions

The main conclusions of the research may be summarised as follows:

1. A near sociometric test with concomitant multiple criteria was constructed, refined and validated to give a rank order coefficient of correlation of .67 ± .064 between positive sociometric status and a total course results Criterion.
2. The sociometric test discriminated significantly between the third and fourth quartiles of performance. The third and fourth sociometric quartiles showed significantly different Criterion performance. The third and fourth Criterion quartiles showed significantly different sociometric performance. Fourteen out of twenty-one students in the bottom quartile of sociometric ranks appeared in the bottom quartile of Criterion ranks. Of the remaining seven, four appeared in the lower half of the third quartile of Criterion ranks.
3. This prognosis from sociometric data was made at the beginning of the second term of a two-year, six-term training college course for men teachers. The prediction-Criterion interval was seventeen months, thus leaving adequate time for diagnostic and counselling procedures.
4. In the specific context of this research a significantly better basis for prediction was provided by:
    (*a*) near sociometric choice than the feasible real sociometric choice;
    (*b*) positive sociometric choice than positive and negative choice combined;
    (*c*) sociotelic criteria than psychetelic criteria;
    (*d*) weighted choices than unweighted choices.
5. In a comparison with non-sociometric predictors the sociometric test gave a higher correlation (rank, .67 ± .064) with the Criterion of total results than either intelligence test scores (Pearson, .07 ± .104) or examination results (Pearson, .54 ± .078) obtained at approximately the same point in the course. It also gave a higher correlation than either of these with final teaching mark (rank, .57 ± .78 as compared with .06 ± .105 and .35 ± .097 respectively, both Pearson).
6. At a point four months earlier in the course it gave as high a correlation (rank, .57 ± .078) with final teaching mark as that obtained from first-year assessments of teaching ability by tutors (Pearson, .56 ± .076).
7. A composite predictor obtained by combining sociometric data and examination results gave a correlation (Pearson) of .73 ± .052 with the Criterion of total course results, the prediction being made at the beginning of the second term in the first year of the course.
8. A composite predictor, obtained by combining sociometric data, examination results and first-year ratings of teaching ability, gave a correlation of .75 ± .048 with the Criterion of total results. This combination of data was not available until towards the end of the third term in the first year of the course.
9. A composite predictor obtained by combining sociometric data and first-year ratings of teaching ability gave a correlation (Pearson) of .645 ± .064 with final teaching mark.

Comment

Apart from its utility as a separate measure, the sociometric test would seem to provide a valuable supplement to existing non-sociometric predictors. Its combination with the early examination results to give a composite predictor with a correlation of .73 with the Criterion, available as early as the beginning of the second term in the six-term course, would seem to be particularly useful for the early recognition of students likely to have difficulty in passing the course, especially as the sociometric test has been shown to be discriminating at the bottom quartile of Criterion performance. Moreover, the sociometric data are not of predictive value only, but of diagnostic also. Student difficulties are not likely to be ones of scholarship or technique alone. They are likely to consist also of problems of orientation and personal adjustment. By revealing the social atoms of the individuals concerned (i.e. the network of incoming and outgoing choices linking them with other individuals) and permitting analysis of the relevant facets of group structure, the sociometric test provides the tutor with the means of added insight into the interpersonal relations of the individuals concerned, and puts him in a better position to help them.

The imminence of the three-year course in training colleges would seem to give added significance to these results. On the one hand it increases the urgency of early diagnosis of probable failures, since there will be even more at stake in failure. On the other hand it gives adequate time for counselling procedures to operate once a reliable diagnostic basis has been secured.

THE EDUCATION OF DEAF CHILDREN SUFFERING FROM CEREBRAL PALSY

M. Ed. Thesis, Department of Education of the Deaf,
University of Manchester

by GERARD CONNOLLY

Purpose of the Research

THE purpose of the enquiry was to make an intensive study of five children, who were both deaf and cerebral palsied, and set this against a background study of the hearing capacity of 262 cerebral palsied children.

Nature of Problem

The nature of the problem of cerebral palsy allied with deafness is presented, together with information regarding historical background, both educational and medical. Details are given of various bodies, institutions, schools, hospitals, etc., caring for the cerebral palsied.

Testing of Hearing Loss

262 cerebral palsied children were tested for hearing loss by pure tone audiometer. The frequencies used were 500, 1,000, 2,000 and 4,000 cycles per second, with a test at 250 if there was no response at 500. To ensure accuracy a re-check was taken at 1,000 in either ear. The mean hearing loss over the frequency range important for speech, 500-2,000 cycles per second, was calculated. No activities were used with the test, since such activities, although valuable for use with children who are not cerebral palsied, prove a great source of distraction with those so handicapped.

From the scores of this testing, the following tables were drawn up.

MEAN HEARING LOSS AMONG 262 CEREBRAL PALSIED CHILDREN OVER THE FREQUENCY RANGE 500-2,000

	15-34 dbls.		35+ dbls.		
	One ear	*Both ears*	*One ear*	*Both ears*	*Total*
Cases	28	11	11	8	58
Percentage ..	10.7	4.2	4.2	3.1	22.2

DISTRIBUTION OF HEARING LOSS AMONG 215 SPASTIC CASES

	15-34 dbls.		35+ dbls.		
	One ear	*Both ears*	*One ear*	*Both ears*	*Total*
Cases	25	8	8	6	47
Percentage ..	11.6	3.7	3.7	2.8	21.8

DISTRIBUTION OF HEARING LOSS AMONG 28 ATHETOID CASES

	15-34 dbls. *One ear*	15-34 dbls. *Both ears*	35+ dbls. *One ear*	35+ dbls. *Both ears*	*Total*
Cases	1	—	2	1	4
Percentage ..	3.6	—	7.1	3.6	14.3

DISTRIBUTION OF HEARING LOSS AMONG 19 ATAXIC CASES

	15-34 dbls. *One ear*	15-34 dbls. *Both ears*	35+ dbls. *One ear*	35+ dbls. *Both ears*	*Total*
Cases	2	3	1	1	7
Percentage ..	10.5	15.8	5.3	5.3	36.9

AVERAGE HEARING LOSS (BOTH EARS) IN DECIBELS AT 4,000 CYCLES

Spastic	*Athetoid*	*Ataxic*
215 *cases*	28 *cases*	19 *cases*
13	24.1	22.3

Results of Hearing Tests

There is a considerable incidence of hearing loss among cerebral palsied children, more so than among children not cerebral palsied. Anong cerebral palsied children 3.1 per hundred show hearing loss of one kind or another, while with children not cerebral palsied the incidence is 0.1 and upwards per hundred for partially deaf and 0.1 per hundred for deaf. A greater incidence of high tone loss was found among the athetoids and ataxics.

Distribution of Cases

The 262 cases were analysed for distribution according to:

Area. Comparison between Areas. The majority of cases were from Lancashire but a comparison of figures from other parts of the country relating to various aspects of cerebral palsy show that the sample of 262 cases can be regarded as typical.

Parental Occupation. It was found that cerebral palsied children can be considered to belong peculiarly to no particular group of society.

Causes of Cerebral Palsy. From 74 cases, showing 15 causes of cerebral palsy, the highest incidences were in Premature Labour (19%), Prolonged Labour (15%), Use of Instruments (13%), Jaundice (10%) and Meningitis (8%).

Deafness in Relation to Causes of Cerebral Palsy. There is a considerable increase in the number of cases of defective hearing where factors of stress and strain have been present at the birth.

Extent of Involvement of Limbs. From 215 cases where the cerebral palsy handicap was that of spasticity it was found that 54% were hemiplegias, 40% were quadriplegias, 5% were paraplegias and 1% were monoplegias.

Laterality. There is little difference in laterality in hemiplegias both within and between the sexes.

Age at Onset. In a sample of 109 cases it is shown that 95% occurred during the first two years of life. No onset is shown after the eighth year.

Age when admitted to school. In a sample of 198 cases it is shown that the children were admitted to school at a reasonably early age, 37% entering by the age of five years and 81% by the age of eight.

Five Deaf Palsied Children

The five deaf cerebral palsied children were given the Terman-Merrill Intelligence Test, adapted by the use of larger material to facilitate handling and by the use of mime or gesture to convey the requirements of the test. No help was given with language when such language was an essential part of the test. The results of the test are presented as a "Mental Age," such a term being used in the sense of a measure of the child's degree or extent of educability.

RESULTS OF TERMAN-MERRILL INTELLIGENCE TESTS WITH FIVE DEAF CEREBRAL PALSIED CHILDREN OVER A PERIOD OF FIVE YEARS

Child	*Chron. age at first test*	*Mental age at*						*Chron. age at last test*
		1st test	*2nd test*	*3rd test*	*4th test*	*5th test*	*6th test*	
R.H.	11.6	4.1	5.3	5.8	6.7	6.7	7.2	16.7
D.B.	10.0	5.6	5.8	7.0	7.9	8.0	Left	14.7
H.S.	12.7	6.0	6.0	7.6	8.6	Left	—	16.0
S.L.	10.0	5.3	5.8	6.8	7.9	7.9	8.2	15.1
J.C.	7.8	2.0	2.0	2.0	3.0	3.3	5.5	12.8

Motor Development

The five children were evaluated for improvement in walking and balance and for improvement of skill in fine manipulative ability as at the beginning and the end of the research. The scales used were devised by the author and given at yearly intervals without previous practice, so that they should be measures of all-round motor development.

All five children had, at one time or another, some treatment by physio- and occupational therapy, but this amounted to no more than two hours a week for each child, and in no case did it extend through the whole of the period of research.

Test of Gross Motor Skills

Walking a line 10 ft. long. Number of faults (foot off line, overbalance, etc.)

Child	*1st test*	*2nd test*	*3rd test*	*4th test*	*5th test*	*6th test*
R.H.	5	4	2	2	2	1
D.B.	1	0	0	0	0	Left school
H.S.	1	2	1	0	Left school	
S.L.	3	2	1	1	1	1
J.C.	3	3	2	2	1	1

Test of Fine Motor Skills

Peg board with twenty-five ¾in. diameter pegs.
Placing pegs in board, using dominant hand. Time taken in seconds.

Child	*1st test*	*2nd test*	*3rd test*	*4th test*	*5th test*	*6th test*
R.H.	360	210	240	150	140	140
D.B.	195	180	150	135	120	Left school
H.S.	60	50	43	40	Left school	
S.L.	90	70	70	65	60	50
J.C.	100	90	90	70	55	55

Speech

Ability to lip-read and ability to talk were also assessed. In this four showed considerable improvement and even the fifth had made some progress.

Educational Development

The Schonell standardised tests in Silent Reading, Graded Reading and Mechanical Arithmetic were given at the beginning and at the end of the research. No practice on the tests was given at any time. Three children showed an improvement at the end of the research. The other two, although still not scoring on the retest, had developed some ability in the subjects.

Standardised Tests of Educational Attainments

		Silent Reading	*Graded Reading*	*Mechanical Arithmetic*
Child	*Chron. age*	*Attainment age*	*Attainment age*	*Attainment age*
R.H.	10.4	No score	No score	No score
	16.9	No score	No score	No score
D.B.	9.0	No score	6.0	7.9
	14.7	8.5	8.10	11.9
H.S.	11.5	No score	5.4	7.0
	16.0	7.9	6.11	8.5
S.L.	8.10	No score	5.2	No score
	15.3	6.10	7.1	7.9
J.C.	6.6	No score	No score	No score
	12.11	No score	No score	No score

In other educational attainments, as found in an ordinary school curriculum, all five children showed progress in varying degree.

SUBJECTIVE EVALUATION OF OTHER EDUCATIONAL ATTAINMENTS

Child	R.H.	D.B.	H.S.	S.L.	J.C.	
Composition	—	30	20	20	—	Beginning.
	10	60	40	30	—	End of research.
Writing	—	40	50	30	20	
	—	70	80	60	60	
Drawing	—	30	40	20	20	
	20	60	80	50	50	
Handwork	10	30	40	40	30	
	40	60	80	60	50	
Physical Education ..	—	30	10	10	—	
	20	60	40	50	20	
Games	—	20	10	—	—	
	20	60	50	50	10	
Dancing	—	30	—	10	—	
	10	50	40	40	10	
Nature Study	—	10	10	10	—	
	20	60	70	50	—	
Gardening	—	30	20	20	—	
	30	50	40	50	30	

Figures given as percentages, 100 per cent. being the score of the performance of a normal child of equivalent age.

Emotional Development

It was found that the two children who had become deaf and cerebral palsied at a later age manifested behaviour difficulties not found in the three handicapped from birth or early infancy.

Vocational Capabilities

One child found suitable employment at the end of the period and two could be considered to be capable of earning a living. The remaining two children presented certain difficulties, the one on account of severe athetosis affecting all four limbs, and the other (a hemiplegic spastic) chiefly because of a certain degree of maladjustment and concomitant epilepsy.

Conclusions

Deaf children who are cerebral palsied should be taught by qualified teachers of the deaf, in a school for the cerebral palsied where all facilities for physio- and occupational therapy are available. In view of the great complexity of handicap it is suggested that a class of deaf cerebral palsied children should consist of not more than six pupils.

Bibliography

A bibliography is given, covering works both in this country and the United States, together with a list of further pertinent literature.

©

National Foundation for Educational Research in England and Wales.
Printed by King, Thorne & Stace Limited, 1-13 Jubilee Street, Brighton, 1,
and published by Newnes Educational Publishing Co., Ltd., Tower House, Southampton Street, Strand, London, W.C.2.,
for The National Foundation for Educational Research in England and Wales, 79 Wimpole Street, London, W.1.

Bur

VOLUME II, No. 2

FEBRUARY, 1960

EDUCATIONAL RESEARCH

A Review for Teachers and all concerned with Progress in Education

Published for
THE NATIONAL FOUNDATION FOR EDUCATIONAL
RESEARCH IN ENGLAND AND WALES

by

NEWNES EDUCATIONAL PUBLISHING CO. LTD.
Tower House, Southampton Street, Strand, London, W.C.2

The Education of Exceptional Children—I.

TEACHING THE MOTHER TONGUE TO BACKWARD AND SUBNORMAL PUPILS

R. Gulliford
Education Department, University of Birmingham

Introduction

TEACHERS of backward children have usually made a careful study of the methods of teaching reading and are ingenious in devising more effective ways of ensuring progress in reading. It is probably fair to say that, although the importance of language as such is recognised, much less thought and discussion centres round the theory and practice of teaching the mother tongue to backward pupils. This is reflected in fewer publications specifically referring to the language development of backward children.

Yet there are many reasons why language development should receive a full measure of thought and attention. Words are an essential means of communication and learning in school. Although extra emphasis is rightly placed in the teaching of backward children on learning through concrete, first-hand experiences, on the use of pictures and other visual aids, on demonstration rather than explanation, words cannot be avoided altogether. Nor could we possible wish it, for a widening vocabulary and a greater command of the mother tongue are both the evidence of, and the means to, intellectual growth.

Language is basic to so much of school work. Reading readiness, reading with comprehension and the quality of written expression depend on the acquisition of a meaningful vocabulary and on a reasonable level of oral expression. Every subject in the curriculum has its own special vocabulary and presents its own problems of verbal communication. For example, in the teaching of arithmetic, especially with backward children, the importance of a number vocabulary is increasingly being recognised in relation to the growth of number concepts and to problem solving. In other subjects (for example, in nature study, religious education, practical subjects), it is essential for the teacher to be aware of the " vocabulary burden " of the topics dealt with and to be aware of pupils' levels of comprehension.

Language is also significant for emotional and social development. An increasing skill in language makes possible co-operation with other children in play and other activities, and also influences the nature and quality of play. Behaviour as the child grows up is increasingly modified and regulated by speech. Consider, for example, how the normal infant, or the child with delayed speech, can be more easily disciplined as his speech and comprehension improves (*You cannot do that because . . . You must do this first, then you can have a turn with that . . .*). Although the behaviour of older subnormal children is influenced by training and example rather than by verbal precepts, there is, nevertheless, a need for them to comprehend ideas which will modify conduct. There is, for example, as Tansley and the present writer have shown, value in the discussion of real-life situations in the course of moral education and in the preparation of school-leavers.

The social adjustment of backward pupils is a matter of concern both in school and after leaving school. Two American investigators, Johnson and Baldwin, suggest that the subnormal child in ordinary classes tends to be rejected by his brighter contemporaries; Laycock, in a small-scale enquiry, found the same trend in an English primary school. Teachers of backward children will confirm that their pupils are more likely to be on the fringe of social groups and that co-operation in work and play develops more slowly than with normal children. The ability to talk to others, to listen and to share interests (i.e. to converse) may make the difference between acceptance and rejection. This is probably true of school-leavers. Follow-up studies by Collman and Newlyn, and by teachers attending the course for teachers of E.S.N. Children at Birmingham, show that E.S.N. leavers participate less in social and group activities than do normal leavers. While a proportion of such leavers do mix more or less normally, joining sports and social clubs, many others only make sporadic, tentative attempts at group affiliation and at forming friendships; some are definitely lonely and isolated. Many factors contribute to this state of affairs (e.g. lack of simple games and social skills), but it seems probable that a limited ability to converse in an interesting fashion may be a factor of some significance.

It is also probable that speech and language are factors in work adjustment. The ability to comprehend instructions, a readiness to ask for help and information when in doubt or difficulty, to ask for route and transport directions, being able to use a 'phone, the ability to cope with an interview, are items which need to be included in the programme of preparation for E.S.N. school-leavers. Follow-up studies of E.S.N. school-leavers show that at least fifty per cent. make a reasonable use of their hard-won reading ability when they leave; we need no survey to know that one hundred per cent. of leavers will need to express themselves in, and comprehend, their mother tongue on many occasions every day.

Language as an intellectual tool

But the chief reason for emphasising language development with backward children is that it is so much a part of the whole process of mental growth. Although the learning of backward children must be based on as much real experience and activity as possible, experience and activity are not ends in themselves. As Watts argues in *The Language and Mental Development of Children*, " Experience must be ordered and systematised and here language is able to play an indispensable part with its apparatus for expressing differences . . . this ordering and systematising can best be effected through free and full discussion of all that has been seen, heard, suffered and done." It is precisely this systematising and ordering of experiences in which backward children are poor. They are poor at noticing the features of things in their experience and in perceiving similarities, differences and other relationships. They are, therefore, poor in abstracting, generalising and classifying which are processes in the development of concepts—whether such concepts as *metal*, *vegetable*, or concepts further removed from the concrete such as *punctuality*, *good*.

This poor ability to notice, compare and generalise is, no doubt, a function of the poorer genetic endowment of backward children, but as we shall see later, the homes of many backward children may be sufficiently unstimulating to limit in some degree the growth of intelligence. In particular, their homes are often verbally limited with little conversation worthy of the name. The intellectual loss is cumulative, for language is not only the means by which experience is systematised; it also promotes the development of intellectual functioning. As Luria points out, " It would be a mistake to suppose that verbal intercourse with adults merely changes the *content* of the child's conscious activity without changing its form," and further " the word thus becomes a tremendous factor which forms mental activity, perfecting the reflection of reality and creating new forms of attention, of memory and imagination, of thought and action." Putting it another way, words are not only the harvest of experience; they modify the child's perception of his world and create higher forms of mental activity.

Simple examples of this can be observed in young children, between ages 4 and 7. The acquisition of new verbal concepts provides new verbal means of exploring their world to add to their well-established means of perceptual and manipulative exploration. For example, a child discovers comparatives and superlatives and many questions follow of the sort " Which is the biggest (fastest, best) in the world." When he is beginning to acquire number language, everything must be counted—the number of forks on the table, the number of prongs on the fork, the number of the people at the birthday party, the number of wheels on the car. Language provides him not only with words to sum up his observations of the world, but also the words are tools which enable him to attend to more features of his world in a more precise and analytic way. The recognition of the importance of speech and language in the development of mental functions and as a regulator of behaviour appears to be the reason for the attention given to speech in Russian psychological research. The idea is, of course, implicit in the writings of Susan Isaacs, Piaget and Inhelder and others. Thus, Susan Isaacs remarks about the children in her school, " They were always free to say what was in their head, to ask questions and to argue. This opportunity to express thoughts and feelings undoubtedly fostered both their verbal reasoning and their objective interest in the world." Terman said: " Language is the shorthand of the higher thought processes, and the level at which this shorthand functions is one of the most important determinants of the level of the processes themselves."

Two conclusions can be drawn from this brief discussion of the relationship between language and intellectual growth. First, that language development should be a focal point in thinking about the education of E.S.N. and backward children. This does *not* mean that their education should be verbal, abstract or academic. It re-affirms the primary importance of activity and experience but stresses the function of language as a means of systematising experience and developing the mental functions for doing so. This point of view could be a corrective to the view, which is sometimes implied if not stated, that backward children are practical rather than verbal and that therefore in teaching them we should concentrate on the development of practical skills, accepting their verbal limitations as the inevitable consequence of their low intelligence.

The second conclusion we may draw is that the first practical step in the teaching of the mother tongue to backward children is the recognition that language growth is a part of mental development as a whole. As Watts again puts it, " No genuine enlargement of vocabulary can come about except through an enlargement of understanding and no real skill in the use of language can come about except through its use in meeting the need to express thought and feeling."

The assessment of language development in backward children

Observation of backward children leaves no doubt that their standard of speech and expression is poor. It is unfortunate that their deficiencies in vocabulary and expression have not been studied more intensively so that remedial measures can be more precisely planned. One reason for the lack of detailed information is the lack of suitable measures of language attainments. There are some vocabulary tests which can be used with advantage. Watts' *Vocabulary Test for Young Children*, with norms from 4 to 8½ years, is suitable for backward children of junior age; it consists of 100 words grouped according to topics. Although it would be too time-consuming to give to many children, it is certainly worth giving to a few if only to increase the teacher's awareness of children's lack of knowledge of quite common words. The *Crichton Vocabulary Scales*, designed for use with the Raven's *Progressive Matrices*, are also worth using.

A method for assessing maturity in the expression of ideas would also be an advantage. Watts has published an *English Language Scale* consisting of a graded series of pictures designed to elicit different levels of sentence formation in children's descriptions. This has proved reasonably satisfactory in use with backward children. Teachers specially interested in this aspect might like to refer to the *Little-Williams Language Scale* for children up to ages of 6 and 7. It would be a distinct asset in the teaching of the mother tongue to have other methods of assessing, perhaps by detailed observation, the maturity of language usage. Test results in reading, spelling and arithmetic point clearly to the extent and nature of pupils' failure in these attainments, but a measure of the extent of language retardation is not so easily obtained. For that reason it tends to cause less concern, except in cases of outstanding deficiency or speech defect.

The language attainments of backward children

One measure of the verbal retardation of backward children is provided by the comparison of verbal intelligence test and performance test results. It is often said that backward children are practical rather than verbal. Some support for this view may be obtained from the claim that many backward children do better on performance tests than on verbal tests. Thus, Duncan found in his rural residential school that the average verbal quotient was 66 (Range 54-76) whereas the average performance quotient, using the *Alexander Performance Scale*, was 96 (Range 67-119). Duncan believed that these results showed that the " inferiority of this group is much more a verbal than a general inferiority." Since these children had practical abilities within the normal range, he believed that their education should utilise these abilities. " That their educational attainments have been low is due to an educational approach through the medium of words, their weakest factor." Accordingly, he evolved graded series of activities involving problem-solving and relational thinking in practical activities. He discarded repetitive crafts and stressed handwork media which necessitated planning, thinking in sequence and perceiving relationships. Practical work was correlated with academic subjects—for example, reading was motivated by the need to read instructions on assignment cards for different practical activities. The method appears to have met with considerable success in terms of attainments; but many practising teachers have voiced the same doubt as Kirk—whether the children studied by Duncan are typical of E.S.N. children as a whole. Duncan admits that his results may be affected by a cultural factor since his pupils were drawn from a mainly rural area which might favour the development of practical rather than verbal abilities. It is interesting to compare, therefore, results obtained by Tansley, who examined 117 E.S.N. children in Leeds with the *Terman-Merrill* and the *Alexander Scale*. His results showed a less marked performance basis: average Verbal quotient 67 (Range 53-87), average Performance quotient 77.7 (Range 50-122). In a preliminary report on annual testing of Sheffield E.S.N. children with the *Wechsler Intelligence Scale for Children*, Portwood states that the average performance quotient obtained was lower than the average verbal quotient. Further reports of this study will be awaited with interest.

Verbal performance test discrepancies have aroused much discussion and investigation, in particular, their diagnostic value in relation to brain-injury and cultural deprivations, and in the prognosis of social and education achievements. Pringle and Bossio gave the *Wechsler Intelligence Scale for Children* to groups of deprived children aged 8, 11 and 14, in a large children's home. At each age group, average performance quotients were significantly higher than average verbal quotients. From their data, they were able to draw the conclusion that early separation and severe emotional deprivation had a significantly deleterious effect on verbal development.

It is clear that the significance of verbal performance test discrepancies is not capable of simple elucidation. Many factors have to be taken into consideration. As O'Connor remarks (in Clarke and Clarke), " so many variables enter into these comparisons that critical experiments have not yet been carried out." It would, however, seem advisable wherever possible that the examination of E.S.N. children should include a performance test and cases of marked discrepancy be the subject of further study. Low verbal scores may be due to one or more of several causes—slight hearing loss, some degree of emotional and social deprivation, or environmental and educational handicaps. Remedial attention to the weak language functions might have beneficial results as well as an educational approach through practical activities in the way described by Duncan.

An impression of the child's verbal ability can also be obtained from the quality of his responses to the verbal items on a test such as the *Terman-Merrill Intelligence Scale*. Qualitative differences may not affect the total score on the test. For example, the word " orange " in the *Terman-Merrill Vocabulary Test* obtains one mark, whether the response is a simple description (it's got pips and it's juicy) or refers to use (you eat it) or an abstract definition (it's a fruit). More use could probably be made of these qualitative differences in responses. In one investigation, Papania scored vocabulary responses in a way which differentiated between concrete and abstract definitions of words. He found that mentally retarded children of a given mental age could define as many words as normal children of the same mental age but at a lower level of abstraction. Badt, using a similar system of scoring for responses of institutionalised mentally retarded children, was able to show that the longer the period of institutionalisation the lower was the level of abstraction. It would be interesting to see further research on the relationship between level of abstraction in word definitions and such variables as age, mental age, and various environmental factors, such as the quality of the child's verbal background. This refined method of scoring vocabulary tests could also be used to assess progress in an intensive programme for language development.

From the point of view of practical teaching, information is needed about the characteristic deficiencies of the oral expression of backward children. A useful procedure which can be applied to a few children in a class is to record either in shorthand or by means of a tape-recorder short periods of spontaneous conversation, or an account of a recent event. Observations from such records[1] and deficiencies noted by Abel and Kinder, Descoeudres, Ingram, Kirk and Schonell are combined in the following summary:

Slovenly or lazy speech

Careless pronunciation, elision of words, and omission of endings (for example, " warra " for " what I," " gonna " for " going to ") is common with backward children. It is interesting in this connection that in a phonetic analysis of articulatory defects in feeble-minded children, Bangs found no marked qualitative differences in their defective speech-sounds in comparison with those of intelligent speech-defective children except for the more frequent omission of final sounds. Poor models of speech in the home environment are one cause of this careless speech, and it is probably related as well to that general slackness and poor motivation of the subnormal which manifests itself in other ways, for example, in poor posture.

Grammatical errors are, of course, frequent. It is, however, a feature which is less important than the way words are put together to express meanings, i.e. clarity and effectiveness of expression is a more important aim for these pupils than grammatical accuracy. In *Backwardness in the Basic subjects*, Schonell, quoting from Lyman, gives a useful list of the most frequent errors in oral expression, and concludes that 45-62 per cent. are in verb forms (subject-verb relationships, tenses), 50-80 per cent. of the errors being in the verbs " to be," " to go," " to see," " to do," and " to come." Most of these errors reflect the normal speech in the child's home environment but some, such as giving regular endings to irregular verb forms, are common in the speech of normal infants and persist longer with backward children owing to their slower maturing. The remedies are unobtrusive correction (especially in group work) and plenty of practice in talking within the classroom so that the child hears and practices the correct form. There is probably much less transfer of the correct form from written exercises to speech than is usually assumed, but experimental investigation of this with backward children is lacking.

Imprecise or over-generalised use of words

Incorrect use of words occurs because children have an imperfect or vague understanding of the meanings of words. For example, a 12-year-old backward boy described a picture of a thermometer as a temperature; on the *Terman-Merrill Scale Vocabulary Test* eyelash is often confused with eyelid, scorch with scald; in the *Picture Vocabulary Test* of the same scale, leaf is often named a flower. This vagueness and lack of precision in the use of words is often noticed by teachers of backward children. Descœudres, in " The Education of Mentally Defective Children," gives many examples of the tendency and as she says, " If we have found confusion and misuse of terms in the realm of concrete things, it is not to be wondered at that more abstract terms relating to school work are also misused." The same tendency to over-generalise the use of words is described by Luria in his interesting account of experiments with a pair of speech-retarded twins. Records made by students at Birmingham have also produced evidence of confusions in the use of pronouns and prepositions.

---

[1] Material collected and analysed by J. Steel, J. Sloan, G. Bithell and Miss H. Humber in the course of preparing Dissertations for the Diploma in the teaching of ESN children, University of Birmingham.

Fluency

There are some backward children who appear fluent in the sense that they speak freely and quickly. Some of these quick speakers ramble on with few pauses and with poor sentence formation. These are the children who tell a story or recount experiences in a form which is often incomprehensible to the teacher although the other children appear to be able to follow it with enjoyment.

Other children are slow and hesitant in expression. This seems partly due to difficulty in thinking. They pause, trying to find a word or name which eludes them and, failing to find it, they try to say what they want in some other way, or to get over the difficulty by gestures or by looking hopefully at the teacher for help. Phrases such as *What's it* or *That thing* are often used to cover the difficulty. The slow thinkers often start a sentence anew and try to form it another way. In one of the most useful articles on the speech of E.S.N. children, Renfrew discusses these difficulties and suggests the tendency of adults to supply the missing word may tend to perpetuate lack of effort in finding words and expressing ideas. Here again, further investigation is needed. How far is the tendency due to insufficient practice in expression, or just a symptom of immature speech development (the characteristic is common with young children) or due to some more fundamental cause?

Other children lack fluency because of an emotional reluctance to talk: the timid, unforthcoming child, and the child who is virtually a non-talker because of a more serious emotional disturbance. These children emphasize that the improvement in the use of the Mother Tongue must take account of personality as much as intellectual factors.

Sentence formation

The development of the sentence in the speech of normal children, especially younger ones, has been the subject of many studies and has been well summarised by Watts. The type of sentence structure used by backward children would repay study for the extent to which children use more complex forms is an indication of the maturity and clarity of thinking. Tentative conclusions based on material collected by students at Birmingham suggest that the level of sentence structure is at a much lower level than would be expected for the ability of the children. Oral and written expression of senior backward children often consists of sentences strung together by *and* or *then*, a characteristic which is common with normal children at the infant stage. Thus, a 12-year-old boy in a D-stream wrote:

> " The picture reminds me of a man coming down the road on a motor bike and he crashed into a lorry and the men got out of the lorry and picked him up and the man on the motor bike cut his leg open and my friend and I went to school when we saw the accident happen and the policeman came with a book and a pencil and policeman copied something down and the glass on the motor bike was broken and a man went in the phone box to phone an ambulance and an ambulance came and the man went away to hospital and the bell went and we went in the hall for assembly."

In the samples of written work by backward children from which this was taken, there were many boys who used a variety of dependent clauses, the order of frequency being: time, noun, result, reason, adjectival, condition. This conforms to the order obtained by Watts for children under 11 years. His order for senior children was: time, noun, adjectival, reason, result. Compositions, like the one quoted, consisting of simple sentences joined by *and* seem to indicate that events are perceived in a disconnected way or as a simple sequence. This might be remedied to some extent by giving plenty of opportunity for describing and discussing events, processes and experiments in various aspects of school work. The infrequency of adjectives and adjectival clauses points to the need for more practice in noticing qualities and finding words to describe them.

Lack of selection and sequence

It will be noted in the example quoted above (which is by no means the poorest example of its kind) that there is a tendency to put everything into the account. The writer cannot select or condense and the events are not put into correct sequence. As M. M. Lewis points out, logical order comes more easily if there is an audience being addressed. In other words, logical order is fostered by purposeful oral work. The re-telling of stories and giving accounts of observed processes are activities which should help in the better ordering of expression.

These characteristics of the oral expression of backward children need further study so that the English scheme for backward classes shall not be merely a reduced version of A- and B-stream work but shall be designed specifically to meet the needs of backward children.

Speech defects

One aspect which has been studied fairly thoroughly is the incidence of speech defects in backward children. Surveys consistently show a higher incidence of defect in backward children. Thus, Burt found that speech defects occurred in 1 per cent. of normal children in his London surveys, in 5 per cent. of dull children, and in nearly 11 per cent. of subnormal children. A parallel survey by Lloyd found speech defects in 0.5 per cent. of the normal group, 5 per cent. of the dull, and nearly 15 per cent. of the sub-normal. Sheridan, examining 100 subnormal children aged 11-13, found 24.5 per cent. of the girls and 41.8 per cent. of the boys had defects. Tansley surveyed 155 boys and 92 girls aged 7-16 in an E.S.N. school, and found that 37.4 per cent. of the boys and 20.7 per cent. of the girls had speech defects ranging from consonant mispronunciations or substitutions to complete unintelligibility. The figures obtained vary because of different standards adopted and differences in the populations examined, but there is no doubt of the need for speech therapy to be readily available in E.S.N. schools and classes, and even more for the work of the therapist to be supported by adequate attention to speech in the classroom. Close co-operation between the therapist and the teacher is needed in the case of articulatory defects to ensure that sounds elicited by the therapist are used and practised in class. In cases of stammering, the class teacher can do much to provide an atmosphere free from emotional tensions and can help to promote a more secure and confident personality in the stammerer. Children with delayed speech or with language retardation will be helped by language activities in class which create the need and stimulate the desire to speak. Renfrew, writing with ten years' experience of speech therapy in E.S.N. schools, stresses that the problems with backward children is not simply one of correcting defective articulation. Even when these children have been taught to articulate, they remain *in*articulate in their ability to express themselves. Paucity of vocabulary and reluctance to express restricts the amount of practice in articulating the correct sounds.

The same point applies to speech *training*, which is still sometimes thought of rather as drill in correct and clear enunciation than as the attempt to foster clarity and adequacy of speech and expression. Modern speech training texts conceive speech training in broad terms—see, for example, texts and teachers' handbooks by McAllister, Bennett and Bruford.

The causes of retarded language development

Environmental factors

Many surveys, notably those of Burt, have shown that backward children are more likely to come from homes in the lower socio-economic groups. One effect of this is that their range of experience tends to be more restricted to their immediate environment—fewer journeys, holidays, and visits to places of interest. Books, play materials and opportunities are more limited. This affects vocabulary growth, for as Watts suggests, a rich and varied environment favours the acquisition of nouns, interesting activities that of verbs.

A narrow range of experience also means that children have less to talk about among themselves and in oral work at school, with the result that they have less practice in expression. Since Burt's surveys in the 1930's, changes in social conditions have probably reduced the experiential handicap of backward children, but the crucial difference between the good and poor home remains—the extent to which parents go over experience with children in conversation, respond to questions and tell stories. This is the essential handicap of the backward child from the poor home and it indicates that one of the chief functions of the teacher is to make up for this deficiency by plenty of discussion of experience, reading and telling stories.

The other effect of the poor home is the poor example which it provides of standards of speech and expression. As Ballard put it, " The teacher must make it more natural for the child to speak the mother tongue than to speak with his mother's tongue." Certainly, many of the errors of usage and some articulatory defects are copies of the speech of the neighbourhood. The fact that teachers often claim that children have one speech for home and another for school indicates that progress can be made in overcoming this.

The effect of low intelligence

The earlier discussion of the importance of language for mental and educational growth referred to the fact that backward children are mentally less active in relation to their experience. Their slow verbal development is partly the result of deficiencies in those mental functions which are involved in concept formation. But in considering the contribution of low intelligence, it should be recognised that inadequacies in the environment of backward children may have affected not merely their skill in the use of the mother tongue but also the development of intelligence itself. There are, as Hebb put it, two determinants of intelligence: the innate potentiality for development (Intelligence A) and a completely necessary stimulating environment. Interaction of the individual with his environment makes possible the development of Intelligence B within the limits set by Intelligence A. We may reasonably question whether the environmental conditions of all backward children have been adequate to maintain their maximum mental growth. We know little with certainty about the stimulation needed for the full development of Intelligence B, but it is probable that among the most important factors is the quality of verbal experiences in the home, especially the amount of talk with averagely intelligent people. Investigations which have a bearing on this point have already been referred to in this journal (Vernon; Lynn) and are summarised in Clarke and Clarke, and Tansley and Gulliford.

The main point for the present discussion is that it is not enough to say that backward children are retarded verbally because of their low intelligence since both their low intelligence and their verbal retardation may, to some extent, be attributed to the same environmental causes. In tackling their language retardation through an intensive programme of language experiences it may be possible to promote a somewhat higher level of mental functioning. This is a hypothesis which requires further experimental investigation.

Two investigations which have a bearing on this point can be referred to. In an experiment reported in 1942, Dawe described the results of an intensive programme of language experiences and training with a group of orphanage children aged 3½ to 6 years 10 months. There were twelve children with I.Q.'s ranging from 65 to 92 (mean 80.6). At the end of the seven months experimental period, the experimental group had made considerable gains in language but also in intelligence test scores, the mean I.Q. having risen to 94.8. The control group, however, showed a slight (non-significant) loss in I.Q. Dawe gives a fair amount of detailed information to show that the experience and the amount of personal attention provided in the orphanage were considerably less than those given in normal homes, and it is not surprising that gains in verbal and mental test scores were recorded. Similar experiments, using backward children living in their own homes, are needed. One such investigation has recently been reported by Kirk. Eighty-one mentally retarded children aged 3-6 years, with I.Q.'s in the range 45-80, were studied over periods of three to five years. Forty-three of the children were included in experimental groups given what amounted to a good Nursery school experience aiming at the promotion of physical and mental health and the stimulation of intellectual and verbal activity. In a cautious evaluation of this pre-school programme, Kirk claims that it had positive results in the rate of children's development, and that accelerated rates of growth were most marked in children who had experienced degrees of environmental deprivation.

These, and other investigations, offer some evidence to support the view that an enriched curriculum for backward children coming from inadequate home backgrounds may not only enable them to make the best of their intelligence, low though it may be, but also promote a degree of acceleration in mental growth in at least *some* children whose experience has been limited either by an impoverished environment, or by emotional and social deprivation.

In trying to secure the best conditions for the growth of language in backward children, other consequences of low intelligence should be noted: for example, a late start in speech. According to Burt's surveys, the subnormal begins to talk at an average age of 2.3 years, the dull at an average age of 1.5 years. One may question, too, whether parents of late talkers provide the kind of speech stimulation which they would have found natural to give to a baby beginning to talk. Certainly, in clinical work, one feels the need to stress the importance of parental stimulus and response in the early stages of talking. A further, and more serious consequence of late development is that the backward child arrives at school age with language at a 3- or 4-year level. Subnormal children at the age of five are at the stage when, as Renfrew has pointed out, their language still requires the individual relationship with mother and such experiences as going shopping, visiting, helping in the house. Instead, the mentally retarded child has to compete in large classes with brighter children who are quicker to express themselves, and secure attention. It is also important to realise that at this stage the dullest children may well be too immature to benefit fully from the stories, rhymes, and other verbal experiences of the infant school and that these should be repeated in the junior school backward class. It is, indeed, noticeable how the simple fairy stories and folk tales are enjoyed by very much older backward children.

Emotional and social factors

Emotional conditions influence language development at every point. Learning to speak begins in the close relationship between mother and child in infancy; disturbances in that relationship can impede language growth, as the studies of deprived children show. Schonell emphasises that, later in childhood, critical, domineering or neglectful parents can have an inhibiting effect on expression. It is all the more important, therefore, that the atmosphere in school should be one which favours expression—a relaxed discipline, opportunities for finding emotional satisfaction through successful achievements, and outlets through creative and expressive activities.

The poorer social development of backward children has already been referred to and indicates the need for the school to provide opportunities for backward children to learn to work and play together, to develop the interests and the simple games skills which promote friendships and group participation. Language is essentially a social phenomenon and children who are withdrawn or socially unaccepted need to be drawn into the group so that their poor social adjustment does not continue to be an additional handicap in verbal development.

The effect of backwardness in reading

The importance of language development for reading has often been stressed. The reverse effect of low reading attainment on language growth has equally to be considered since it cuts a child off from one of the main sources of general knowledge and vocabulary growth, as well as of the awareness of sentence patterns for the expression of ideas. This is a further justification for an ample programme of reading to children to compensate for this lack.

One of the topics which merits investigation is the adequacy of the backward child's comprehension of what he reads. In the early stages of reading, the teacher often pauses to discuss the meanings of words and ideas in the text. With better readers, the same need is there but comprehension is more likely to be checked by written comprehension exercises. For the purpose of language development, continued efforts should be made to check on new meanings encountered and to discuss individually and with the class as a whole what has been read.

Methods of teaching

The foregoing discussion has indicated what the main features of a good language programme should be. It must be based on an enrichment of experience and on plenty of opportunity for working over that experience in conversation and discussion. Compared with average children, the backward need more guidance from the teacher to observe and to think about what they observe. They need more definite help in the building up of simple concepts and the related vocabulary. Since language is not merely an intellectual function, pupils' emotional and social development must be promoted through good teacher-pupil relationships, co-operative group work, and opportunities for creative and expressive activities.

Vocabulary development

McKee gives a summary of suggestions for the development of vocabulary and comprehension which is typical of the recommendations in this field.

1. Rich, varied and meaningful experiences.
2. The use of pictures and drawings.
3. Opportunity for informal discussion for the exchange of experiences and ideas, for questioning and simple explanations.
4. Much simple explanation by the teacher of new and partially formed concepts.
5. Determined effort to make the child feel dissatisfied with lack of meaning concerning anything he encounters and to encourage him to ask frankly for such meanings.
6. Much oral reading and story telling by the teacher in which new concepts and meanings are presented in sufficiently familiar settings to ensure clear understanding.

The fifth suggestion is perhaps the most difficult to apply with backward children, yet it is a very necessary one since such children are more prone than others to accept that they do not understand something. One wonders how far this is due to their inborn limitations and to what extent it is a product of their experiences of failure, not only in school but, in more subtle ways, in their pre-school lives.

The first requirement is the widening of experience and activity. As Ingram points our, there are three kinds of experience: at first-hand, at second-hand, and the experience of expression. All those who have written about the education of backward children stress that backward children, owing to the concreteness of their thinking and their limited background of experience, need as much first-hand experience as possible—by the observation and handling of real things in the classroom, by visits and school journeys. This needs to be supplemented by adequate second-hand experiences—pictures, models and other representations; wireless, T.V. and visual aids; and by hearing stories. The experience of expression is needed not only as a means of " checking impressions " but as a means of enlarging experience through dramatisation and creative work.

The type of experience must be determined according to the age, maturity and previous experience of the children. Thus, in her account of speech work with groups of E.S.N. children aged 6-9 years, Renfrew suggests that the youngest children had missed, at the time when they could have benefited most from it, the opportunities of prolonged contact with mother in the course of daily routines of home life. The speech sessions, therefore concentrated on experiences of home and family, shops and food. Shopping expeditions were undertaken, and walks round the neighbourhood, observing and discussing the ways of domestic animals, the contents of gardens and other features of the immediate environment. It is certain that older children need similar discussion of quite ordinary things and events which, with ordinary children, would be taken for granted. Senior children need to be made increasingly aware of the life of the community around them and in the larger world. MacDonald recommends that the teacher should read news items from the daily paper regularly to the class, as a starting point for discussion which often prompts children to follow the news on following days. With children approaching school-leaving, Tansley and Gulliford refer to the need for works' visits and other experiences for increasing the comprehension of working life and its related verbal demands.

Ordinary school activities provide many opportunities for vocabulary growth—the names of tools, materials and processes in practical work, housecraft, gardening; of the natural world in nature study and elementary science; of the community in social studies. The underlying aim should be the development of understanding, and the attainment of maturer levels of concept formation. The probability that different school activities can contribute their share to the development of understanding should be borne in mind. One of the five principles enunciated by Descoeudres for the education of backward children was that of *correlation* or *concentration*—the grouping of subjects around a central theme. She believed that this was even more necessary with backward children than normal children in order to assist and strengthen the formation of associations.

One way in which this concentration might be achieved would be to adopt a suggestion made by Dolch. In a reaction from word lists composed on the basis of frequency in children's speech and reading, he suggested that vocabulary lists for fields of interest should be prepared. These should be used as a guide in the course of teaching, the aim being to develop depth of meaning rather than a superficial breadth of vocabulary. The need for the teacher to have in mind such a list of words in the teaching of number has been emphasised by Kirk. Vocabulary control is an accepted principle in teaching reading; more use might be made of it in following vocabulary development—so long as such lists are used as a guide and not as a basis for cramming. Words are only truly useful when they are integrally a part of concepts.

There is an extensive literature on the subject of word lists, compiled on the basis of frequency in speech, writing and in reading matter. It is useful for the teacher of backward children to have some knowledge of this work if only as a means of making him more conscious of the vocabulary he uses when talking to pupils. Burrough's study of the vocabulary of 6-year-old English children is useful for reference and includes a summary of research in this field.

Class organisation

In the process of systematising experience and building up vocabulary, as we have pointed out earlier, social and emotional factors are important, and the attitude of teacher to children and children among themselves can inhibit or favour expression. The organisation of the class needs, therefore, to be one which produces a happy, free atmosphere in which children are encouraged and eager to speak. In addition, many writers urge the necessity of arranging for speech work in small groups. Humber, working with small groups for conversation in an E.S.N. school, felt that the small group was necessary if the reluctant talker was to be drawn into the conversation. Moreover, in the small group the teacher could more easily make unobtrusive correction of errors and suggest better choice of words and sentence patterns when needed. Both Renfrew and Dawe confirm the value of the small group, Dawe stating that groups had to be kept small if real benefit was to be obtained from visits. These three were working with junior children and were obviously aiming at providing that quality of verbal interchange which takes place in the good family. But A. E. Smith, writing about the development of speech at the secondary level, makes a similar plea for group work. He remarks that the need for group work is well-established in reading and arithmetic and that it is just as necessary in the case of talking. Staffing ratios, of course, make this suggestion difficult to carry out, but it might be worth bearing in mind that just as small remedial groups are often organised in reading, small speech groups might also be arranged for backward talkers. One other way of arranging for groups has been suggested by Schonell—the occasional division of the class into conversation groups, which can be so much more effective than full class discussion.

These groups could be composed on a sociometric basis in the way that has been shown to be effective for group writing of plays and stories in an experiment by Richardson. One other practical measure is to take News Time with the younger children in a small group round teacher's desk while the rest of the class are engaged in other activities.

Stimulating oral expression

The provision of a range of interesting experiences is a first step towards better oral expression so that pupils not only have something to talk about but are more eager to do so. In addition, many English textbooks offer useful suggestions for stimulating talk, for example, in *Fluent Writing and Speaking* and *Let's Talk.* In *Backwardness in the Basic Subjects*, Schonell lists nineteen activities for oral English. The main ones are the use of pictures; accounts of films, stories and incidents; dramatisation; story-making; lecturettes; giving directions; telephoning activities; and visits to other classes with prepared oral activities. Schonell is viewing oral work here as an indispensable preparation for written work although he emphasises that not all oral composition need be a preliminary to written work. One of the useful points he makes about the value of oral work is that it should provide " an expressional situation for the development of the personality," i.e. that the readiness and ability to express depends on personality factors as well as on having something to say. Timidity, withdrawal, and emotional inhibition have to be overcome as much as purely verbal difficulties. In this, other aspects of the curriculum (drama, puppetry, movement, art) can play a part, developing more confident and out-going personalities better able to express themselves. The contribution of movement, mime and creative drama in stimulating the imagination and allowing for the expression of thought and feeling in non-verbal ways is hard to measure but experience confirms its value (see Bruford). As this type of work develops, the contribution becomes a direct one, through verbal expression in drama, puppetry and story-making. In this type of work, it is essential to remember that backward children have more need of hearing stories than most normal children owing to their limited verbal experiences at home and their poor reading ability.

A plea for a well-planned approach to talking is made by A. E. Smith in *English in the Modern School* and many of the suggestions he makes can be applied to backward classes. He insists on four requirements for stimulating discussion: the *right topic*—one in which the pupils are already interested and informed or can easily be made so; *the right occasion*—one arising naturally out of work in hand or projected; out of the child's immediate environment or from his immediate or future needs; *the right atmosphere*—one free from formality or any restraint save the conditions imposed by good manners; the *right objectives*—the importance of clarity, relevance and order before correctness of usage. His insistence on the need for plenty of practice in conversation and discussion at the secondary stage is most welcome, and also his admission that the task of the teacher in this respect is not easy. " He must be initiator, participant, mentor and critic, finding a balance between these roles to ensure that the talking is more than idle chatter." This is in contrast with the fear expressed by some teachers that discussion may be a waste of time or that Head Teachers and H.M.I.s will think it so. This type of work produces little tangible evidence of the time spent whereas written exercises, often of limited value, give a sense of achievement. Yet with backward children even more than with normal children attention should first be given to oral work.

Systematic training

In teaching the mother tongue to normal children, the main direction of effort is the planning of experiences about which children can talk, and creating the conditions for motivating talk. With backward children, there is, in addition, a need for more definite training. In her account of work with junior E.S.N. children retarded in speech, Renfrew reports that organising interesting experiences and activities did not always lead spontaneously to expression. Activity was apparently satisfying for its own sake, needing no words to express it. Simple " games " were, therefore, organised which involved acting on simple instructions and requests (such as " Hide the thimble "), followed by the child being expected to say what he had done. She reports that this work often revealed difficulties which the therapist had not fully appreciated before—the pupils' difficulty in listening to instructions and their imperfect comprehension of common words. For example, the instruction " Hide the thimble behind the waste-paper basket " revealed confusion between " shopping basket " and " waste-paper basket " and a lack of understanding of " behind "—as well as other prepositions. Nouns were always easier for the children to understand than verbs; for example, pat, stroke and rub were difficult to distinguish. Getting the children to say what they had done showed that their lack of adequate speech was not just due to emotional reluctance to talk but to an inability to find words to sum up situations. At first, they would reply by gestures and a verbal response had to be suggested to them. After some weeks, they began to attempt their own spontaneous descriptions.

Kirk also states that specific help is needed in learning how to form sentences in speech. He gives the example of the child being asked to say what his father does. The first response may well be " Works." Further questioning may elicit, " In a factory " and " makes shoes." Kirk suggests that the teacher should then put the ideas into a sentence and then get the child to " Tell all about it," eliciting the sentence " My father makes shoes in a factory." Kirk wisely cautions against the notion that sentence length can be developed mechanically; it should be done in natural purposeful situations. The small conversation groups previously referred to can do much work of this kind.

Kirk also suggests giving instructions to pupils to carry out a simple activity and then having them recount to others what they have done. A natural place for this kind of training can be found in many aspects of school work—in practical work, science and physical education. Oliver quotes an E.S.N. boy's description of an exercise he had invented in P.E.: " *First you lay on your stomach on the log. Then you tighten your back mucels you shape yourself like a banana and at the same time try to put your little fingers together and do not forget to keep your balance stay there for five seconds.*" Work of this kind should help to promote the development of logical order and the use of more mature sentence forms. As we have seen, backward children are more likely to perceive and describe a sequence of events in a simple, unconnected sort of way. The description of actions which they have just performed or seen performed is one context within which to suggest the use of dependent clauses and for the audience to point out the need for logical order. In this connection, M. M. Lewis's suggestion for the greater use of diagrams in oral and written English merits consideration. He points out that there is usually plenty of work with objects and pictures in the early stages of language work and that the next step is usually for the child to deal with what he has seen but which is no longer in front of him. He suggests that an intermediate stage is needed in which the child should learn to arrange his mental picture first in order to be able to express it. He feels that for this purpose, especially with backward children, there is value in diagrams.

Practice in classification and fluency in recalling words are also recommended by Kirk. " How many animals do you know? " " What things do you eat ? " In the development of a number vocabulary—such words as *shorter*, *longest*, *middle*, *biggest*—he suggests the use of a tiered shelf of three layers, children being given instructions to put, for example, the smallest toy on the longest shelf. Further discussion of the means for developing number vocabulary are given by Tansley and Gulliford. Renfrew mentions practice in expression from specific tasks such as finding differences between two similar objects—two pencils, two buttons, two cups. At first, it was found that the noting and expression of differences had to be prompted by questions such as " Are they the same colour? Are they made of the same stuff? " Specific training in the discrimination and expression of differences is reminiscent of some of the activities advocated by Descoeudres. In her exposition of methods with backward children, there is a combination of formal methods side by side with " the utilisation of the natural activity of the child."

The language programme used by Dawe in the experiment referred to earlier was also a combination of definite training with experience and activity methods. There were four types of training: 1. Training in the understanding of words and concepts. 2. Looking at and discussing pictures. 3. Listening to poems and stories. 4. Going on short excursions. In the first section, 1,455 words were chosen from some of the well-known word lists and then classified into related groups. These words (not necessarily all of them) were then studied in individual training periods during the seven months of the experiment, to find out words which the child did not understand and to explain the words, demonstrating them or teaching them in some meaningful way (e.g. by using pictures). Dawe stresses that these were not cramming periods. She endeavoured to make them interesting conversationally and to ensure understanding and comprehension throughout. In group training periods, the children went on excursions, heard stories and discussed pictures. The experimenter attempted at all times to introduce, and explain where necessary, new words and phrases as much as possible. She also attempted to stimulate curiosity, to help the children think critically, to notice relationships, causes and effects and to eliminate careless thinking and speech.

The methods differ little in essence from many of those used in teaching the mother tongue in good backward classes but it was intensive and there was a more systematic introduction of words and concepts, ensuring that several experiences were focussed on the meaningful acquisition of new words. An important difference, of course, was that the experimenter was able to offer training individually and in small groups. It would be interesting to see experiments of similar, intensive kind in ordinary backward classes, adapting the methods for larger numbers.

Conclusion

The language development of backward children is of major importance partly because of its educational and social value but mainly because it is closely linked with intellectual development. Backward children are slow to develop those mental functions upon which concept formation and vocabulary development depend. They are further handicapped by a late start in speech, by retarded language abilities on reaching school age and by the later development of reading skills. In addition, backward children are more likely to come from homes which are verbally unstimulating and to make poorer emotional and social adjustments. More research is needed into these factors and into their interaction so that their effects can be minimised in practice, and a fuller understanding of them lead to improvements in teaching methods.

The range and quality of vocabulary in backward children requires further study, for example, in relation to the verbal demands of particular aspects of the curriculum, and the child's needs in post-school life. Investigation is also needed into the way of promoting more mature and orderly forms of expression, particularly in facilitating the transition from action to words, experience to expression. Such experiments should not, of course, be merely coaching but should be based on sound educational and developmental principles.

Bibliography

ABEL, T. M. and KINDER, E. F. *The Subnormal Adolescent Girl.* New York: Columbia University Press, 1942.
*ANDERSON, V. A. *Improving the child's speech.* New York: O.U.P., 1953.
AXFORD, W. A. *Handicapped Children in Great Britain.* Special Subject List, No. 30. London: Library Association.
BADT, M. I. "Levels of abstraction in vocabulary definitions of mentally retarded school children." *Am. J. Ment. Def.*, 63, 1958.
BALDWIN, R. "The social position of the educable mentally retarded child in the regular grades." *Exceptional Children*, 25: 3, 1958.
BALLARD, P. B. *Teaching and Testing English.* London: U.L.P., 1938.
BANGS, J. L. "A clinical analysis of the articulatory defects of the feeble-minded." *J. of Speech and Hearing Disorders*, No. 7, 1952.
*BEASLEY, J. *Slow to Talk.* Bureau of Publications, Teachers' College. New York: Columbia University.
*BELL, V. *On Learning the English Tongue.* London: Faber and Faber, 1953.
*BRUFORD, R. *Speech and Drama.* London: Methuen, 1948.
BURT, C. *The Backward Child.* London: U.L.P., 1937.
BURROUGHS, G. E. R. (ed.). *Study of the Vocabulary of Young Children.* Edinburgh: Oliver & Boyd, 1957.
*CHESHIRE EDUCATION COMMITTEE. *The Education of Dull Children.* London: U.L.P., 1956.
RAVEN, J. C. *Crichton Vocabulary Scales.* London: H. K. Lewis, 1951.
CLARKE, ANN and A.D.B. *Mental Deficiency—the changing outlook.* London: Methuen, 1958.
COLLMAN, R. D. and NEWLYN, D. "The leisure activities of subnormal and other ex-pupils in England." *Am. J. Ment. Def.*, Vol. 62, 1957.
*CUTFORTH, J. A. *English in the Primary School.* Oxford: Blackwell, 1952.
DAWE, H. O. "A study of the effect of an educational programme upon language development and retarded mental functions in young children." *J. Exp. Ed.*, Vol. II, 1942.
*DESCOEUDRES, A. *The Education of Mentally Defective Children.* London: Harrap, 1928.
DOLCH, E. W. "Vocabulary study by fields of interest." *Elem. Eng.*, 32.
DUNCAN, J. *The Education of the Ordinary Child.* London: Harrap, 1942.
HEBB, D. O. *The Organisation of Behaviour.* New York: Wiley, 1949.
HUMBER, H. M. "A study of conversation in the language development of junior ESN children." *Unpublished Dissertation, Dip. ESN, Univ. of Birmingham.*
JOHNSON, G. A. "A study of the social position of mentally handicapped children in the regular grades." *Ph.D. Thesis, University of Illinois*, 1950.
*KIRK, S. A. *Early Education of the Mentally Retarded.* Urbana: University of Illinois Press, 1959.
*KIRK, S. A. and JOHNSON, G. O. *Educating the Retarded Child.* London: Harrap, 1957.
*INGRAM, C. *Educating the Slow-Learning Child.* London: Harrap, 1953.
*ISAACS, S. *The Children We Teach.* London: U.L.P., 1932.
*LEWIS, M. M. *Language in School.* London: U.L.P., 1942.
*LEWIS, M. M. *The Use of Diagrams in the Teaching of English.* London: Ginn, 1936.
LURIA, A. R. *Speech and the Development of Mental Processes in the Child.* London: Staples, 1959.
LITTLE, M. F. and WILLIAMS, H. M. "An analytic scale of language achievement." *University of Iowa Studies in Child Welfare*, 13, 1936.
OLIVER, J. N. "Motivation of ESN boys through physical activities." *The Slow Learning Child*, Vol. 4, No. 1.
*McALLISTER, A. H. *The Primary Teachers' Guide to Speech Training.* London: U.L.P., 1941.
*McDONALD, J. L. "The teaching of language to older ESNs." *Special Schools Journal*, No. 47, 1958.

---

*Items marked thus constitute a bibliography of readily readable material.

*McKee, P. "Vocabulary Development." In 36*th Yearbook Nat. Soc. Study of Education*. Public Schools Pub. Co., 1937.

Papania, R. "A qualitative analysis of the vocabulary responses of institutionalised mentally defective children." *J. Clin. Psychol.*, No. 10, 1954.

Portwood, P. F. "Progress report on the Sheffield ESN study." *B.P.S. Bulletin*, No. 34, 1958.

Pringle, M. L. K. and Bossio, V. "A study of deprived children." *Vita Humana*, Vol. 1, No. 3/4, 1958.

Pringle, M. L. K. and Tanner, M. "The effects of early deprivation in speech development." *Language and Speech*, Vol. 1, Pt. 4, December 1958.

*Renfrew, C. E. "Speech Problems of Backward Children." *Speech Pathology and Therapy*, April 1959.

Richardson, J. E., *et al.* *Studies in the social psychology of adolescence.* London: Routledge and Kegan Paul, 1951.

*Schonell, F. J. *Backwardness in the Basic Subjects.* Edinburgh: Oliver and Boyd, 1942.

Sheridan, M. D. *The Child's Hearing for Speech.* London: Methuen, 1948.

*Smith, A. E. *English in the Modern School.* London: Methuen, 1954.

*Stapleton, M. "Experimenting with a tape recorder." *Special Schools Journal*, No. 46, 1957.

*Stapleton, M. and Renfrew, C. E. "Come and talk." *Special Education*, 1950.

Travis, L. E. *Handbook of Speech Pathology.* London: Peter Owen, 1959.

Tansley, A. E. "The use of mental and scholastic test data and case history information as indication for the treatment of ESN children." *M. Ed. Thesis, University of Leeds*, 1952.

*Tansley, A. E. and Gulliford, R. *The Education of Slow Learning Children.* London: Routledge and Kegan Paul, 1960.

*Taylor, E. A. *Experiments with a Backward Class.* London: Methuen, 1949.

*Watts, A. F. *Language and Mental Development of Children.* London: Harrap, 1944.

---

* Items marked thus constitute a bibliography of readily readable material

The Education of Exceptional Children—II

HIGHLY INTELLIGENT CHILDREN

PART I—THE PSYCHOLOGY OF THE GIFTED

W. D. WALL

Introduction

HOWEVER we interpret the term and where ever we draw the borderline, high intelligence is probably the most precious of a community's social and economic assets. From gifted individuals come the sources of creativity, of leadership and of progress on all levels—moral, ethical, artistic, scientific and political. On the other hand, apart altogether from the social and economic loss caused by the wastage of unused ability, the highly intelligent maladjusted or anti-social individual can be a greater threat to his fellows and to his society than his less able contemporaries.

Thus, all other considerations aside, the best all-round education and training of the most able group of children and adolescents is an essential aspect of the conservation and exploitation of our natural resources. To some extent, the Education Act of 1944 recognised this, crowning nearly half a century of attempts to give able children the right to a fitting education in school and later in University irrespective of their social background. It is probably true to say that, in this country, administrative action has gone further than in almost any other to open the doors of educational opportunity to all children and, with the promised increase in University places, it may be that all the most able young men and women in our community will eventually have the chance of continued study well on into their twenties. It is appropriate, therefore, that we should ask a number of questions concerning the identification of high ability, the kind of education that we provide for able children, and whether, in fact, we are developing natural talents to the full in the best possible way. Not all the questions which we might pose under these headings can be answered by objective research and studies ; many of them involve decisions of a social and ethical kind. What we can do, however, is to examine the knowledge we already have as a basis for reviewing that part of our educational system and methods which deal with the pool of high ability.

Some distinctions and definitions

Terman's famous series of studies of children of very high ability is entitled " Genetic Studies of Genius." He took as his borderline for the inclusion of children in his sample an intelligence quotient of 140, which on his test would include between 0.5 and 1 per cent. of an age group. However, it is evident—as Terman himself points out—that the common connotation of genius implies something more than high intelligence, though probably genius cannot exist without it. Special talents are, in rare cases, found to a marked degree independently of high general ability, but they do not as a rule result in genius. Genius in any field, in fact, implies a combination of high general ability and in some cases special talent, with qualities of personality and character and probably also a fortunate conjunction of circumstances. As defined by achievement, the number of geniuses, and indeed of men and women of eminence, in any generation is very much less than the number of those who have outstanding ability and talent, even combined with a reasonably satisfactory and stable personality.

Hollingworth, whose work is complementary to that of Terman, used the term "potential genius" and applied it to that very small proportion of children whose intelligence quotients reached or exceeded 180. Even here, however, although, in common with Terman's sample, many of the children she studied produced in their childhood and adolescence creative work of the kind which frequently marks the early years of the great, and many of both samples occupy posts of distinction in the arts and sciences, few indeed have since become recognised as "geniuses," in the full sense of the word.

Genius in its fullest sense is, of course, of immense importance to any society; as, however, it is very rare, and in any case we know so little about the conditions which produce it, our main attention must be devoted to the general pool of high intellectual ability from which will be recruited our scientists, teachers, leaders in political and business life and indeed the professions generally. We tend at present in our English educational system to assume that this pool is defined by the ability to profit from a grammar school type of curriculum in adolescence. Roughly, this means, with current selection ratios, that we set the borderline at about I.Q. 110-115; in general, our University courses and courses of equivalent status seem to pre-suppose a borderline of around I.Q. 120-125. Thus, by implication, our educational system defines high ability in terms of borderlines which include somewhere between five and twenty-five per cent. of the population, according to the stage at which we make our choice.

Wastage—Do we locate all able children

This does not mean that the best twenty-five or five per cent. necessarily all find their way to grammar school or university. It does, however, probably mean that few of the outstandingly able children now fail to qualify for entry to grammar school. Wastage seems to be greater, however, among those who, while not perhaps supremely brilliant, nevertheless have the ability required for University studies and subsequently for a professional career at a high level, but who either do not enter grammar schools, and take academic courses or who abandon their studies at or shortly after the end of the compulsory schooling period. Recent figures provided by a number of L.E.A.s* (nineteen County Councils and thirty-one County Boroughs) seem to suggest that whereas in all some thirty-six per cent. of an age group follow a grammar school type of course, and some fifteen to twenty-five per cent. are in grammar schools as the result of the eleven-plus allocation procedures, little more than five per cent. of the age group succeed at the end of a five-year course in taking successfully five important subjects (English language, a foreign language, a science or mathematics and two other subjects) at G.C.E. "O" level. Somewhat less than five per cent. go further and successfully qualify in two or more advanced level subjects after seven years.

---

*I am indebted to Mr. W. R. Smedley, Chief Education Officer, Bournemouth for this information

Our present allocation procedures, however, although generally more efficient than any other form of examination or spot guidance, can take no account of a number of factors which determine potential performance. Virtually—in spite of the possibility of transfer at thirteen—a child's education during adolescence and consequently his chances of higher education are determined, in this country, by the result of five years in the primary school. It is true that increasingly over the past fifteen years our system has provided possibilities—through evening classes, academic courses in secondary modern schools, special late entry examinations at the University, University extension courses and a multiplicity of similar opportunities—for the youth whose abilities are late in declaring themselves or who suffered from a social disability in childhood, to re-enter higher education or to make up for lost time and opportunity. Re-entry, however, is difficult, intellectually, and in spite of economic aid, financially. It seems likely that only a few of those who might profit, do in fact succeed in doing so.

However, ability as shown in school learning and subsequently by vocational success, social contribution or whatever other criterion be chosen, is only in part determined by strictly genetic factors. "Operational intelligence" as we are coming to call it, is a product of inate ability and the educational effects of the environment: just as the limits of physical height are determined by the genes but the height attained is a product of the accidents of nurture and a sufficiency of the right kinds of food and exercise, so the ability which we see and attempt to measure in children and adolescents is the sum of inheritance motivation and nurture. We know, from the work of Spitz, Bowlby, Roudinescu, and many others that marked lack of affectionate mothering will result in a lowering of ability and that emotional deprivation in infancy particularly affects the development of verbal concepts and abilities. Moreover, if this continues beyond a certain point, its effects are irreversible. From the work of the Population Investigation Committee which is following the growth of some 5,000 children born in 1946, it seems to be indicated that the quality and level of parents' interest in their children markedly affects not merely academic attainment but the complex general ability we measure by intelligence tests. It is reasonable equally to suppose that the quality of the formal education given within the primary school, the relationships of pupils in their early school years to their teachers, the nature of the stimulation—intellectual and emotional—which they receive at school will also be at least a marginal factor in the growth of ability. We may thus surmise that there is a proportion of children—of a size unknown but not negligible—whose talents never show themselves to the full because the environment starves them in important ways.

This is not to say that very high ability is likely to be completely smothered, even by severely adverse circumstances in childhood. The early lives of many geniuses, for example Bunyan, Faraday, Dickens, D'Alambert—show the contrary. What does seem to be true, in this as in many fields of human growth, is that very high general ability can triumph over a severity of adverse circumstances that would overwhelm the less able; and of this, Helen Keller, born deaf and blind, is a supreme example. Before, however, working in the L.C.C., Burt found that, of children tested in primary schools and who had a level of general ability suiting them for a University career, some forty per cent. failed to reach a University. Floud and her co-workers have found that, since the 1944

Act, the position has improved, but they remain convinced that a considerable proportion of gifted children fail to secure the education they deserve.

On the other hand, general ability and talent well above the average may never declare themselves if nurture is lacking, or if emotional deprivation is marked; in other cases, ability may grow but be sterile because of emotional blocks to achievement or become anti-social and destructive in its effects because the environment has shaped it that way. All of us are aware of adults, often by virtue of their intelligence and education, in positions of considerable responsibility, whose influence, because of their experiences at home and in school, is either egocentric or destructive and inhibiting in the lives of others with whom they work every day.

Importance of Healthy Personality Development

Thus, it is difficult to over-estimate the importance of a constructive education, at home and in school, for able children if they are to realise their intellectual capabilities to the full. However, socially and personally something more than a merely reasonable state of emotional equilibrium is necessary. The kind of democracy which we favour, though it recognises as ethically basic to the system, the fact that all human beings are equal in rights and in value, recognises also the inequality of ability and therefore of function. Leadership—though not necessarily authority or overt power—comes from the most able. Hence, it is of fundamental importance that highly intelligent children and adolescents should see their high endowment, not as a source of egocentric and purely personal advancement, but as a trust which in fact increases their responsibilities towards others. It seems important, too, that such youths should gain an insight into the sources of prejudice, that they should become aware of factors which distort their own thinking and that of others and that they should learn positive attitudes of a creative kind rather than developing—as so many do—a cynical criticism and a somewhat negative outlook. To all this we must add a driving interest, a temperamental stability, and above all, a capacity for sustained dogged hard work without which intelligence and other qualities are likely to be of little avail.

We may ask whether the present stress on inter-personal competition which marks some facets of our educational system is fully desirable; and whether, in fact, we make sufficient demands and of the right kind upon our ablest ten per cent. of pupils.

The Mental and Physical Health of Able Children

The romantic notion is still largely current that genius is maladjusted emotionally, often feeble physically, and that poets, in particular, tend to die young. Similarly, the popular picture of the highly intelligent child presents him as puny, and bespectacled, as precocious in language interests as he is retarded in his emotional development, liable to over-fatigue, difficult to get on with, and so on.

So far as we know from systematic studies, there is little truth in these stereotypes. Some poets and artists have died remarkably young; but many more have lived well beyond the expectation of life of their generation. Many with more than a spark of genius have had grave defects of character which have led to disturbed private lives, to wild excesses and to considerable and sometimes fatal social difficulties. Many more, however—though their originality and intelligence have perhaps shown themselves in private and public lives that depart from the commonplace—have been fundamentally effective, well-organized human beings with their share of adversity and of happiness. Indeed, many of the truly towering and universal geniuses like Shakespeare, de Vinci, Horace, Rabelais, Moliere, Cervantes, Rembrandt, seem to have lived hugely and with gusto, experiencing no greater outward occasions of tragedy and misfortune than others of their period and achieving in old age a complex serenity. The same would seem to be true if we accept as a definition of genius or emminence, an entry in the Dictionary of National Biography.

Terman and his co-workers studied between 1921 and 1925 the mental and physical traits of 857 boys and 671 girls with Stanford-Binet I.Q.'s of 140 or more discovered in the schools of California. Very full case-histories were made of these children—including a thorough physical and mental examination, tests of achievement, of interests, and character, home ratings and so on—and the group was compared with a random sample of ordinary children from the same schools. They found, as one might expect, in the gifted group as in the normal, a considerable range of inter-individual differences and consequently considerable overlap in many respects between the two groups. However, gifted children proved to be, on the whole, taller, heavier, physically healthier and somewhat more advanced than the average in their general physical maturity. In terms of character and personality development, the general superiority was even more striking; the typically gifted nine-year-old child tended on a variety of tests and ratings to test as high as the average twelve-thirteen-year-old. On ratings by parents and teachers, over eighty per cent. of the gifted exceeded the mean on volitional traits, nearly seventy per cent. exceeded the mean on emotional traits and nearly sixty per cent. on social traits. They were less inclined to boast, were more trustworthy when tempted to cheat, their character preferences and social attitudes were more wholesome, and their emotional stability greater. Most striking of all, as one would expect, is the superiority of the gifted group in the whole intellectual field. In formal attainments, such children are some forty per cent. accelerated compared with their normal age mates, their advance being most marked in reading, language usage, arithmetic reasoning and least, but still striking, in spelling computation and factual information about conventional school subjects—though even here they were well above average. In their intellectual and play interests out of school, ninety per cent. of Terman's gifted nine-year-olds exceeded the mean and on the average were considerably more than two years in advance of their contemporaries.

It is clear from Terman's enquiry that the able child tends to be superior to the average in every way: there is no law of compensation which offsets high intelligence by inferiorities in non-intellectual fields. However, the degree of superiority to the average is not the same in all fields and is greatest in those most closely related to what we understand by intelligence—originality, intellectual interests, achievement test results. Moreover, when the gifted group is looked at as a collection of individuals, then one sees the same infinite variety of patterns as in any other group, and examples can be found of personality defect, social maladjustment, behaviour problems and physical handicaps of various kinds. The difference lies mainly in that among the gifted the incidences of such patterns are less than in the general population.

Terman and his co-workers followed up this gifted group in 1923, 1924 and 1925, in 1927-28, in 1936-7; and again in 1945. At the time of the last survey, the mean age was 35 years, though, of course, some were considerably older and others younger. By and large, the general promise of the earlier years was fulfilled and the gifted group in adulthood was markedly superior to the general population in ability, personality and general social performance. Both sexes exceeded in mean height not only the general norms for the population but those for university graduates, the death rate was only four-fifths that of the general population. The delinquency, divorce, maladjustment and insanity rates were lower than average. Of the gifted group, proportionately eight times as many entered College (ninety per cent. men, eighty-six per cent. women) as from the population as a whole, and they tended to graduate one year sooner than average. Over half the men and nearly one-third of the women took postgraduate degrees. Over eighty per cent. of the men in 1945 were in the two highest professional groups and during the depression of the 1930's, whereas some fifteen-twenty per cent. of males were unemployed, only one per cent. of the gifted were.

By no means all these able youths became what we would call geniuses, or even eminent men and women. However, by 1945, the group had produced ninety books, fifteen hundred articles, more than 100 patents; twenty-one were listed in *American Men of Science* and seven in *Who's Who in America.*

One of the most interesting parts of the follow-up survey was Terman's study of 150 of the most and 150 of the least successful. On all the early ratings (1922) except physical health, the unsuccessful were lower, and there were even larger differences in 1928, the general mental health of the successful becoming by 1940 increasingly and markedly superior. Fewer of the unsuccessful group married and among those who did, the divorce rate was more than twice as high; they had less job stability, more drift and more frequent unemployment. Self ratings, ratings by wives and by parents showed the successful group to be higher in perseverance, self-confidence, integration towards goals, and absence of inferiority feelings.

It is of interest to note, too, that in terms of educational attainment the successful and unsuccessful were more or less equal in primary school, but at the High School stage they began to draw apart and at the College level the discrepancy was striking.

It is arguable perhaps that some of the superiority of the successful group was itself a product of success and had a cumulative effect; but it is significant that at the earliest stage of the enquiry when the majority of the subjects were aged nine or less, striking differences were apparent between the two groups and that they were of a kind and direction which subsequently seem to have intensified. Terman's study reinforces the importance given to the early detection of maladjustment and to positive attempts at ensuring a fully balanced personality in children. Terman sums the matter up himself by saying " Contrary to the theory that great achievement is usually associated with emotional tensions which border on the abnormal, in our gifted group, superior success is associated with stability rather than instability, with absence rather than presence of disturbing conflicts—in short, with well-balanced temperament and freedom from excessive frustrations."

Children of high ability who are not detected

It is at least arguable, however, that the very severely disturbed and maladjusted did not enter into Terman's research, because their maladjustment was such that it affected the test-performance by which they were selected. Moreover, our greater awareness of the effects of environment—and particularly of the influence of the specifically educational content of the pre- and early school environment—might lead us to ask whether some highly able children failed to be selected because of the inhibitive effects of social deprivation. These two lines of thought of course reinforce Terman's main thesis as stated above and draw attention to the need for even earlier detection of high ability than he was able to undertake—especially if we wish to remedy the effects of maladjustment and early deprivation and thereby effectively increase the pool of high ability.

It is unlikely, though not of course impossible, that children whose ability was actually high enough to enter Terman's sample but who did not do so because of environmental causes lowering their operational intellectual efficiency, subsequently realised their potentialities without any special help. It is possible, too, that some children do not grow intellectually and educationally quite like the generality. Olson, who has studied considerable samples of children over lengthy periods in an environment where they could develop more or less in their own way and without the constraints and the need to conform which characterise most systems, suggests that there are some children whose growth is far from linear Such children have a pattern of their own, they may develop intellectually and educationally very fast for a period and then, for no apparent external reason, stand still for months or even years before moving forward again. In general, as Terman found, early intellectual status predicts subsequent standing and though the actual I.Q. may vary considerably between, say, nine and nineteen, adolescents tend to occupy the same position relative to their total group as they did when children.

A similar finding comes from English work. Dr. Morris investigating reading attainment in the schools of Kent found that those who were outstandingly good readers at the age of eight remained outstandingly good at eleven and were those who qualified for entry to Grammar School courses. Thus, detection of high ability is, in most cases, possible in the first junior school year—and probably much earlier than this. But exceptions—and quite marked ones—do occur. To explain them we must invoke changes in the emotional and social factors which condition the operation of intelligence; and irregular but probably hereditary and biologically determined patterns of growth. Only by continuous sensitive observation are we likely to detect and wisely to educate such children, many of whom now probably are overlooked.

The difficulties of very high ability

So far we have been speaking in the main of children who fall in the top one or so per cent. of the population. Hollingworth, working in the same period as Terman but in a different part of America, made a special study of a very small number of children with outstandingly high ability—an I.Q. of 180 or higher—and who occur only at the rate of one or two per million. She came to one very important general conclusion. Children such as those in Terman's group and the many more just below his borderline—i.e., those who fall in the band of superior ability between, say, I.Q. 125-150—are the best placed. Success in school comes relatively easy to them; they have the ability for acceptable leadership, efficient self-management and adjustment. At the same time, there are sufficient of them in number to afford equality of companionship, mutual self-esteem and understanding.

Above I.Q. 170, and still more higher than this, children have very considerable difficulties, especially in social adjustment and adaptation to school life, especially in a school which insists on keeping children more or less in step with each other. Such very intelligent children find companions of their own age or even a bit older hard to come by; their language, their interests, the sheer play of their reasoning are so far beyond those of their contemporaries. Among other children, even those well above average in ability, they tend to be unpopular because they always " want to organize the play into complicated patterns with some remote and definite climax as the goal."

Intelligent children, and particularly the highly intelligent, tend to have interests well in advance of their physical age. Precociously concerned with such things as matters or origin, destiny and evil in the abstract, immature in experience but mature in logic, they rouse the anxiety, antagonism and jealousy of adults. They easily become negatively suggestible and the illogical conduct of adults may lead to rebellion or to a gathering cynicism.

The root of these difficulties—as with so many difficulties with other kinds of children—lies in the discrepancies which exist within the child himself and between him and the demands and expectations of the environment. Terman studied those children in his sample whose I.Q. exceeded 170. He found, for example, that while mental age at six might be eleven, physical development would be accelerated only by ten per cent., and social development by between twenty and thirty per cent. Few of these children were rated by parents and teachers as sociable or well adjusted and of Terman's sample, thirty-four per cent.—more than twice the proportion of his main gifted group—were considered to be more or less seriously maladjusted or almost completely withdrawn from social intercourse. Similarly, while creativity and originality are a mark of high ability, between one-third and a quarter, both of Terman's and of Hollingworth's groups, were only fair or even poor in their general educational achievements.

New York University's Counselling Centre made a follow-up study of rather more than 100 children, who at the time of testing were about five and had I.Q.'s of 170 or more. The conclusions of their study are that in the pre- and early school years such children function with no more stress than young children in general but even in the nursery school they have some difficulty in finding companions.

The picture, however, changes markedly in the primary school years and in adolescence many succeed for a long time in maintaining a high level of intellectual functioning;

but loneliness, lack of companionship and of understanding mean that this is achieved at increasing emotional cost. Some show diminution of social interest, creativity and productivity; a few are remarkable only for consistently high intelligence test scores.

According to this study, such children tend to come from middle and upper middle class families where the mother is herself intelligent and cultivated and tends to reject her feminine role, thus complicating her relationship with her child. She may reject the child openly; more usually such rejection is unconscious and the guilt and anxiety it provokes leads to over-protection and too great an identification with the child.

To this, some children react with an increasing compulsion to succeed and a diminishing satisfaction with success; others with self-doubt; others with an anxiety which prevents them from risking failure and tends to inhibit the fulfilment of their ability. Typically, such children work well below their capacity; their interest flags, they become restive: often they are frustrated and resentful. On the other hand, they may become the object of parental pressure and exploitation—even exploitation for commercial gain—with an over-emphasis on intellectual development at the expense of almost every other aspect of personal growth.

Some of the problems of these children and of those who, still outstanding, are not so highly gifted, arise from deeply-rooted attitudes in our society, stereotypes of what is and is not acceptable from children and adolescents, fears of high intelligence and its power of penetrating shams and defences. Intellectually, a very able child of ten may well be superior to his parents, to most adults whom he meets and to his teachers. Experientially, however, he cannot be as knowledgeable and many things are decided in the light of accumulated experience rather than that of logical thought. The intellectual superiority of the able child and adolescent thus constitutes a continual threat. From a very early age he or she asks penetrating and awkward questions, remembers in detail facts and incidents, broods over inconsistencies in words and deeds, in opinions and perceives expediencies without himself having the ballast of experience or the blunted sensibilities that often go with it. The mind of an adult in the emotional life of a pre-adolescent with only a child's experience to illuminate it can be threatening, even frightening to adults, especially if they feel responsible for the child's education, and see the authority which they base on age, experience and maturity undermined by intellectual thrusts beyond their power to parry.

Small wonder, then, that Hollingworth found an emotional bias against the highly gifted among teachers or that many adults react to such children by trying to take them down a peg or two, by refusing to answer their more searching questions, especially those concerning the deeper human relationships and sexual matters, by a covert or overt hostility disguised as a discouragement of precocity.

However, two things seem probably important in interpreting American evidence on this matter in the light of conditions in this country, or indeed, in Europe generally. The first of these is the somewhat different social structures of the countries concerned and the different emphasis placed upon ability. Fundamentally, of course, the Americans accept individual differences and, indeed, much of the research work demonstrating these differences is of American origin. However, there is a strong emphasis on equality and a perhaps greater tendency than here to reject any form of behaviour markedly deviating from the average or normal. Moreover, since highly intelligent children tend proportionately to come more frequently from economically and culturally superior homes, and since in England there is a highly developed system of private schools, usually within residential areas of a relatively homogeneous social composition, individual outstandingly able children are likely to be less lonely and less likely to be regarded as " odd " and " peculiar " than the U.S. In a culture like the French, which places very great emphasis on verbal skills and intellectual precocity, difficulties of the kind mentioned in American research are even less likely to arise—though, of course, others may and do.

The second important factor is the nature of the educational systems themselves. It will be recalled that the researches of Terman and Hollingworth are agreed that very able children, although in most cases in advance educationally of their age-mates, nevertheless, do not always fully achieve the level which their abilities would warrant. At the time these researches were undertaken, most American primary schools had an age-grade system and children were promoted from year to year if they had mastered a prescribed syllabus. Bright children tended to be accelerated (and dull ones retarded) by a year or two; but rarely was a child accelerated by more than two or three years. As Olson points out, this kind of lock step system is less rigid now than it was. It of course continues in its full rigour in most Latin countries. Here it ceased between the two wars and streaming and age promotion may in fact make it possible to cater for children of outstanding ability in a way impossible in age-grade systems.

Another feature of European systems is also worthy of note. In general, the American system is not selective in adolescence, though, within the Junior and Senior High Schools (rather similar to our Comprehensive Schools) pupils have a wide range of choice of course. Our system, in common with many of those of Europe, tends to be heavily selective, certainly from the age of eleven, and increasingly so thereafter. Not only is there the broad allocation between modern and grammar schools, but within the grammar school field, some individual schools expect to get only pupils of a very high level of academic ability. Within such schools also, certainly from the age of thirteen and progressively through the next three to five years, there is streaming in terms of ability, choice of subject and courses and a considerable variation possible in the number of subjects prepared for public examinations.

Those who have studied the growth of very able children have remarked that their difficulties of a social and educational kind are most likely to be marked within the middle years—virtually what we think of as the junior school period—and that they lessen as age increases the range of social movement, allowing them to seek companions of their own kind and as mastery of educational skills allows them to seek and find the intellectual challenge they need. Our system of progressive selection by academic attainment, though it has many defects, makes it more likely that the able child, even in the primary school, and certainly at the secondary and subsequent stages will meet his equal and find stimulation. This, of course, does not mean that we have solved the problem of how the most able one, five or ten per cent. of children should be educated. This is a matter which is occupying the attention of educators in America as well as in this country and Europe. It will form the subject of Part II of the present paper.

A New Publication:

Vocabulary of the Secondary Modern School Child

An Empirical Study of the Words Known by Senior Pupils in Secondary Modern Schools

D. G. Burns, M.A., Ph.D.,

University of Leeds

N.F.E.R. OCCASIONAL PUBLICATION No. 1

Now available at more than twice the size originally planned, this publication reports an inquiry undertaken to obtain information about the words understood by children in Secondary Modern schools. The results are recorded in the word list contained in this study.

This series is intended to make available to research workers and others, specialised matter arising from research work undertaken in this country by the N.F.E.R. itself, by individual research workers, by officers attached to L.E.A.s or by the research departments of Universities. Material which would normally find its place in one or other of the learned journals will not be published, nor will matter which could be expected to achieve publication in book form. The series is intended to provide an outlet for work of a high level but with a limited readership and which would otherwise become rapidly inaccessible.

Obtainable direct from the National Foundation for Educational Research,
79, Wimpole Street, London, W.1. *175 pp., price 8/6d., post-free.*

The Teaching of Modern Languages—I

PROBLEMS IN MODERN LANGUAGE TEACHING

DAVID WILSON BELL

IN this first article on modern language teaching, discussion will be confined mainly to the general problems which are encountered, and it will be convenient to look critically first of all at the existing state of affairs. We may then proceed from a clarification of these problems to a consideration of such objective and practically useful evidence as we have which bears on the teaching of modern languages.

The Scope of Modern Language Teaching

It is apparent that " modern languages " is not one subject, but many, potentially at least. This matter of the scope of the curriculum subject under the heading of modern languages is particularly important, since it raises questions concerning the application of experimental results obtained when working with any particular language or group of languages to the teaching of others, especially those of widely differing structure. The number of modern foreign languages at present taught generally throughout England and Wales is only about half a dozen, of which French is easily the most common, followed by German, Spanish and Italian and certain other European languages in some places.[1] These languages are, however, representative at least of two major language groups, Germanic and Romance, which differ widely in their general structure and, more particularly, in their speech patterns. With the expansion of language teaching in establishments of Further Education, the actual number of languages taught and the number of major linguistic groups involved have already been enlarged and are likely to continue to be so, particularly with regard to the Slav group. Thus, though the general linguistic background remains Indo-European, the structural variety introduced in the various languages and language groups, renders the utmost caution necessary in interpreting the general applicability of any research results.

Research into language teaching of any kind is comparatively scanty, especially when we compare it with the effort so far devoted to the basic subjects of the school curriculum—such as Reading and Arithmetic—since the end of the second world war. By far the largest part of available research into modern language teaching has been carried out in the United States, and of the rest, much is devoted to the teaching of English as a foreign language. At present, therefore, our best guidance for the teaching of modern languages is likely to come from applying general learning theory and what we know of child development and maturation to the problems confronting us.

Modern languages have, with other subjects of the curriculum, a high degree of complexity from which it is difficult realistically to partial out separate aspects of study. Teachers frequently complain that educational research is too esoteric and limited in that it does not provide them with readily applicable and foolproof " methods." On elaboration, this objection is frequently qualified by criticisms of the irrelevance of detailed attention to some one particular and narrow aspect at the expense of a coherent broad approach to their classroom problems. However, objective assessment and, if possible, accurate measurement of attainments in this or indeed any other subject is basic to the solution of most problems—for example, that of comparing the effectiveness of different methods of teaching. Such comparative assessments or measures are of most use when expressed in the same terms and when they measure the same thing quite unambiguously and reliably.

---

[1] An analysis of modern language teaching statistics is contained in " Modern Languages," H.M.S.O. pam. 29 (Min. of Ed.), 1956.

Thus, attempts at measurement are a first step and it is not surprising that the most reliable and hence the most useful individual researches in modern language teaching have tended up to now to deal with the comparatively narrow aspect of measurement and possibly with some limited teaching problem in depth, rather than a global attack on all the problems of method at once. It would be of great service to modern language teaching if more members of the profession would undertake thorough objective investigation within limited spheres of their teaching activity. The attempt to tackle the basic problem of measurement as the prelude to more global studies is likely itself to be a lengthy process, but it is something teachers could contribute to and would be of service to the advance of modern language teaching.

However, before we can measure how far aims have been attained, we must clearly define them, preferably in operational terms which can be tested experimentally rather than as vaguely phrased or philosophic ones. Unfortunately, in many reports from official and semi-official sources and also in the prescribed syllabus of some examination Boards there is a dearth of precise definition. For example, one finds justification of the following kind for the inclusion of modern languages in the curriculum:

> " As a discipline, most languages can offer valuable scope for the exercise of the powers of observation, comparison, analogy, accuracy and concentration, as well as for auditory, oral, visual and mental training."

This appears to postulate notions of " mental discipline," of " faculties " and of the transfer of training. A considerable amount of experimental work has already been done in this field, with the result that earlier ideas concerning transfer of training have either been abandoned or very much modified. We have learnt from the experiments which have been already carried out that a subject should be taught for its intrinsic value rather than for any supposed disciplinary value, that transfer of the effects of training is likely to take place only if the teacher deliberately plans for such transfer in his method by consciously drawing the attention of the pupil to the nature of the operation performed in a given learning situation. Habits formed in one sphere may, in fact, inhibit the growth of apparently similar habits in others.[1] Valentine admirably summed up the danger of including some generally applicable and beneficial transfer effect amongst the aims of modern language teaching by pointing out that if, as enquiries showed:

---

[1] An objective criticism of theories of mental discipline and transfer of training appear in a series of papers by Hamley and others in the *British Journal of Educational Psychology*, before the war.

> " there are limitations in the possibility of a general training of reasoning through science or mathematics, there are even greater limitations to the possibilities of a general training through the study of foreign languages."

Modern language teaching in schools is likely to be most successfully approached if it is justified in terms of its intrinsic value and its aim defined as that of efficiently teaching the language by the best available means. Such a practical view of modern language teaching as a whole is, in fact, embodied in the same report as was cited earlier:

> " The pupil must learn as well as possible to understand, speak, read and write the language; and, at suitable stages in his progress, he must learn what he can of the history, society and culture of the people who use it."

This, so far as it goes, is unexceptionable. What is now necessary is to *define* levels of spoken accuracy and fluency, of reading skill and of ability to write in a foreign language; and to determine what constitutes a reasonable entry into its history and culture.

Of course, when aims are stated in precise terms, as distinct from comfortable generalities—as, for example, that mastery of the spoken language is shown when the pupil can answer the telephone and make himself understood by native speakers—differences and controversies arise concerning the relevance of the items chosen and the values of those omitted. Without some precision, however, there can be no measurement, even of an elementary kind. Until such a procedure is adopted, all assessment will be subjective impression, and until objective measurement is attempted no one can tell whether a given measure—whether test, public examination or teacher's estimate—is or is not fair to pupil and teacher, or whether it is predictive of the way in which the skills acquired can be used in real situations.

Achievement Testing in Modern Languages

Thus, even before method is considered, aims require definition, and this must be done as far as possible in empirically measurable terms. To some extent, this has been done implicitly rather than explicitly in various public examinations, and the tendency has been for those who construct tests to use success in such public examinations as their criterion. Even the *ad hoc* teacher-constructed tests seem, not unnaturally, to have this objective in mind. It will be noted that this is tantamount to saying, if more precisely defined, that the aim of teaching is to get pupils through a prescribed examination, an aim which has frequently been depreciated by official enquiries.

The testing arranged and carried out by the language teacher gives him a rough but usable measure of his pupils' progress in terms of the work he has set them. There are however, dangers that erroneous conclusions may be drawn if too much is claimed for the results of such testing. Regular testing, including class exercises, helps the teacher to diagnose the difficulty experienced by the individual pupil. Dangers arise when comparisons in performance are made between individuals or groups of pupils. It is here that the great need arises for standardized tests of attainment in which the difficulty-grading of the items has been carefully analysed and related to a detailed agreed syllabus.[1] A considerable amount of work has been done in this field in the United States, though

---

[1] Recent examples are the Standardised French Grammar and Vocabulary Tests prepared by T. S. Percival in co-operation with the University of Durham Department of Education and published in 1951 by the University of London Press.

English norms are not at present available for most of these tests, nor is the test universe necessarily acceptable for curricula in use in this country. Most of the recent work which has been undertaken in Great Britain has so far been largely experimental and is not generally available. Some of this work will be discussed in more detail in a later article, but there is ample scope for work in this field.

Standardised attainment tests in modern languages have been constructed to cover vocabulary and grammatical aspects of language teaching separately, as in the *Percival Tests* referred to above and in the *Active French Tests* by Morris and Emerson. Other tests, such as the *Iowa Placement Examination Series*, contain vocabulary, grammar and comprehension sub-tests in the same form. The form of the questions is generally sentence completion or a multiple choice answer, designed to minimize the effects of guesswork. It is interesting to note that comprehension passages of the type set in public examinations can and do form part of the standardised attainment test in modern languages, contrary to the view sometimes expressed that such tests cannot be used to evaluate the more complex linguistic operations. Tests of aural attainment, such as the *Co-operative French Listening Comprehension Test*, can be applied in a similar way to test the pupils' understanding of the spoken word. Tests of this sort generally make use of tape recordings to standardize speech, and the pupils record their answers in specially printed booklets, generally with multiple choice answers printed in them. The aural test shows that active teaching methods can be subjected to the same rigorous appraisal as more formal methods, and this can remove doubts as to the efficacy of teaching by these methods. Usually, tests of this sort cover a whole course in the specified language. The teacher's manuals generally contain norms for given age groups or grades in the course, together with advice on the establishing of local norms.

The preparation of standardized tests of attainment in modern languages presents few technical difficulties to qualified persons, though considerable time, effort and resources are involved. A major problem arises, however, when such tests are designed for use in our school system, or indeed for any system which has a prescribed general syllabus. Though curricula are not prescribed in this country except in general terms, the backwash effect of public examinations is generally acknowledged to have the same effect as an imposed curriculum. The pupil's progress in modern languages thus tends to be measured by the teacher in terms of what his subjective experience leads him to estimate as the pupil's progress towards success in these examinations. This is understandable since the success of both pupil and teacher are popularly judged by this criterion. For practical reasons, therefore, standardized tests of attainment should be related to the requirements of the public examinations which tend to determine the curriculum. This is in no sense a comment on the adequacy of such examinations, either in prescribing the scope of a subject or testing what has been attained by examinees, nor is it suggested that standardized tests of attainment in modern languages are only of use to the teacher when such a relationship with the public examination has been established, since a properly constructed test is always a reliable measure of the pupil's progress in the field which it is known to cover. To relate attainment tests closely to the examination syllabus which determines the curriculum would, however, mean that the reliable attainment test would also be, to the same extent, a reliable predictor of potential success in the public examination. It would thus have a considerable value in educational guidance in common with attainment tests in other subjects, especially if other objective assessment were not available to the teacher. One major drawback to this procedure is the type of public examination syllabus which requires a " competent " or " high " standard in language papers, or refers inquiring teachers, and perhaps even its examiners—to earlier examination papers. These are then merely assumed to be adequately representative of a hypothetical test item universe. The fact that an examination board expects a certain distribution of scores from its candidates and fixes its pass level accordingly is of little consolation to teachers unless they are assured that each examination paper is a representative test of what their pupils are required to know. There should also be some attempt to grade material in an ascending order of difficulty, since a time limit is in operation in these examinations. The significance of this argument is readily seen by comparing the variety of prose and translation passages set for a given level in an examination over a period of years. The solution of this difficulty lies beyond the scope of the teacher as an individual, but he can tackle it as a member of a professional pressure group.

A cursory glance at the modern language section of most good libraries will, of course, reveal a selection of manuals on teaching method in modern languages. Most of these are, however, to be distinguished from an objective appraisal of method by standardized comparison of achievement resulting from different teaching operations in that they are anecdotal or systematic. They contain the accumulated personal teaching experience of their authors or their colleagues, and, as such, are to be valued as guides to the teaching of modern languages, particularly as revealing useful hypotheses to be tested. They are, however, to be carefully distinguished from experimentally established findings, in that the appraisal of such methods is admittedly subjective and subject to an unknown degree of variation on this account and because of the absence of standardized procedure in assessing the conclusions concerning the methods used. Such methods also tend to proceed, though often unconsciously, from *a priori* assumptions concerning the learning situation.

A further consideration which appears to be quite important in reviewing the general methods employed by the modern language teacher is the historical approach. In advocating the study of living languages, the schoolteachers of the Renaissance period tended under Humanistic influence, somewhat naturally, to adopt the analytical approach then characteristic of the teaching of classical languages, which later became generally known as the " formal method." In as far as this method received any theoretical treatment, it was supported as a mental discipline largely on the basis of the old faculty psychology. It is apparent, however, that the same arguments apply to the validity of this formal method of teaching modern languages as were discussed in connection with mental discipline as an aim of teaching languages. In addition, it is noteworthy that there is here a complete lack of recognition of the process of mental development in the child and particularly of the importance of motivation to learning. If indeed, as it seems, this method does not lead to effective utilisation of the foreign languages, then it must be called thoroughly to question once its effect as a general mental training is denied. Indeed, it might seem unnecessary to consider the formal method further, except to stress the danger of relapsing into it whenever more active ways are tried and reveal, as they do, that children's learning under any method is not continuous and simply cumulative. We know that there are plateaux and inhibitive conditions which arise and block progress for a time. The danger here is that the teacher may revert to formal instruction which, by its outward form, gives a semblance of inward learning. It will be recalled that the exponents of the Direct Method revolted against the formal tradition by attempting to teach the foreign language and its pronunciation through the medium of that language itself. This approach has been found to be successful where the teacher-pupil ratio is small and where the level in both teaching and learning ability is above the average. In less favourable circumstances the method has often failed, though it has been successfully used in economically highly motivated and intensive language courses outside the scope of the school system[1]. The failure of the Direct Method in the classroom situation has led by a sort of Hegelian synthesis with the Formal Method to the Oral Method of teaching modern languages. This is generally held to incorporate the best features of both the earlier systems. Whether this is in fact so does not appear to have been objectively tested and indeed would be difficult to test unless the methods themselves were clearly defined and then were made explicit. As general systematic methods they can perhaps only be assessed in the sense that the individual operations comprising them can be broken down into operational terms for further assessment.

To expand further the historical development of modern language teaching would be beyond the scope of this article. Its relevance to an objective appraisal of modern language teaching lies, however, in revealing the predominantly systematic and *a priori* nature of current methods of teaching modern languages in schools. It is only in the light of an awareness of the need for objective research that we can move towards finding scientifically established methods of teaching modern languages. This point is clearly brought out in the historical review of modern language teaching in England, throwing light on the development of method, contained in the comprehensive study by Mark Gilbert.[2]

Readiness to Learn

Despite the freedom from centrally prescribed curricula enjoyed in this country, there still seems to be insufficient awareness of the extent to which curricula and methods are determined by tradition or administrative convenience. The first Hadow Report recommended that secondary education should begin at eleven years of age. The adoption of this recommendation has meant that subjects considered as a result of current practice or grant regulation to be appropriate to the secondary grammar school curriculum could not normally be studied in our national school system until the child reached this age. The psychological grounds on which this decision was partly based, not to say excused, are no longer considered generally valid. Thus, we have a fresh opportunity of considering critically the age at which different curriculum subjects—in this case modern languages—should be introduced into the school. Such an alproach should be based on what we know of the development of abilities and aptitudes of pupils.[3] This is the procedure which would seem to be approved by the Ministry of Education in noting that "a modern foreign language may be taught in any type of school in England."[1]

---

[1] The writer has taken part in Direct-Method training of foreign airline crews in English, where it would seem possible to approach the optimum conditions for success by this method.

[2] Gilbert, M., *op. cit.*

[3] Education Act (1944), S.8.

The young child placed in a foreign environment is, of course, strongly motivated to become proficient in the language of that environment in order to satisfy his needs. In early childhood he has also the advantages of less rigid speech habits and the absence of inhibitive factors attributable later to the selfconsciousness of adolescence. Though evidence is not yet conclusive, it does not seem likely that the early learning of a second language has a detrimental effect on the mental development of the child, or gives rise to conditions such as stuttering, for example. This applies provided that a consistent source and method of presentation of the two languages is observed, and provided that psychological barriers and certain negative affective conditions are avoided. Amongst such barriers are religious and national animosities and affective conditions suggesting the superiority of the languages involved. This evidence is also subject to the provision that the languages are learned by spontaneous, informal or play methods, avoiding formal or task methods. A truly bilingual situation is found in this country only in certain areas of Wales and Scotland. In as far as it applies to Wales psychological evidence of the type discussed here has received corroboration by workers in the field.

Penfield, working in Canada, concludes that young children are physiologically better equipped to acquire language skills than are adults or adolescents. From his experience as a neurological surgeon he notes that there is an age when the special areas of the brain concerned with speaking, the understanding of speech, reading and writing, achieve optimum plasticity and that physiological evolution causes the brain to specialize in language learning before the ages of 10-14 years, after which it seems to become slower, more rigid and less receptive in this respect.

The available evidence is not yet conclusive, but is sufficient to suggest that modern language teaching might usefully begin during the primary school period—if it can be adequately motivated and if the general experimential background of the children is favourable to it. It is, of course, outside the scope of this article to consider the staffing difficulties involved, but a cursory examination of what is happening or about to happen in the field of mathematics teaching suggests that an earlier approach to modern languages would certainly be feasable if some re-deployment of suitably qualified teaching staff were undertaken.

The Classroom Situation

(*a*) *Intellectual Factors*

However sound the teaching of modern languages in the primary school may be shown to be, the fact remains that, for the immediate future at any rate, most pupils will begin to learn a first foreign language at about eleven years of age, to be followed perhaps by the introduction of a second language a year or so later. Intellectually, the pupil will generally be of above average ability. At the age of 12-13 years, however, differences in special abilities become increasingly apparent in a group of relatively homogeneous general ability. Two complex groups of these special abilities which appear particularly operative in modern language learning are verbal and memory abilities, and a reliable measure of these is of considerable assistance in predicting potential success and diagnosing probable causes of failure in language attainments, thus minimising wastage of teacher's and pupil's time.

---

[1] Min. of Ed. pam. 29, p. 4.

Care must be taken not to infer from this that different standards of attainment in, say, French and German, indicate a failure to progress satisfactorily in one of these subjects on the ground that the same potential ability can be mobilised in each case. This would be to ignore the influence of the more highly specific abilities associated both with tackling particular language structure and with the type and degree of activity required by the teacher from the pupil in a given learning situation.

Another aspect of this problem is that of the learning burden encountered in learning a foreign language. This is a function of the structural and conceptual differences between the mother tongue and the foreign language, differences which may be highly relevant in comparing standards of achievement by the same pupil in different languages or in the same language by pupils of different linguistic background. Different modes of learning will also tend to produce different performance in the same pupils. For example, if German is taught merely by a process of rote learning, which involves a special memory factor not highly correlated with general ability, the order of progress in a group of pupils may be very different from that which might be obtained where greater stress is laid on the use of general ability. The significance of these facts is surely that when making comparisons in performance the modern language teacher must be aware of the variation in the potential abilities of pupils and in the learning burdens placed upon them by different languages.

(*b*) *Emotional Factors*

No one who has attempted to teach irregular verbs on a hot summer afternoon can seriously deny that affective factors operate in the modern learning situation, and yet it is not unusual to encounter among experienced teachers as well as amongst those in training a resistance to accepting the lessons of group psychology in class teaching. This may be explained in part by understandable mistrust of popularised psychoanalytic notions and in part by a feeling that attention to emotional factors may be made an excuse for lack of intellectual rigour. The fact remains that most of our foreign language teaching in schools begins and ends during the period of adolescence, a period of anxiety and internal disharmony in which new drives are constantly seeking outlets. The teacher cannot avoid this situation; he is faced with the choice of adapting his methods to make use of these drives or of engaging in a conflict with his pupils leading to negative motivation in the form of punishment and minimal learning as an avoidance reaction.

The adolescent linguist generally wants to be taken seriously and is concerned with utility as an end of his studies. His co-operation is thus readily assured if the subject matter of his studies is as much in accord with the interests of his age as stock replacement of class texts and material permits. A considerable number of course books using this approach has appeared since the war, and much narrative material in adult evening class courses appears eminently suitable from the point of view of interest for use in secondary school courses. Grammar instruction can be elaborated where necessary for examination purposes. An advantage of this material is that it humanizes the subject matter, relating the pupil first to his immediate environment and then to similar interests in the foreign language environment. The need for a carefully graded approach to the learning of the grammatical structure of a foreign language after the speech habits of the mother tongue have become fixed does not posit the need to start with a vocabulary appropriate to the Victorian nursery. The position can appear even more ludicrous if the more expendable course books are replaced with modern texts whilst the eager young mind is encouraged to utilise its blossoming skill by extensive reading of *contes des fées*. A course book which takes both itself and the adolescent seriously forms a natural and workable basis for oral work, since it can be made to appear relevant to the adolescent's new consciousness of the world around him.

Another emotional trait relevant to modern language teaching in secondary schools is the adolescent's lack of confidence in himself and others. Few teachers would claim a degree of fluency in a foreign language which precludes occasional error becoming apparent. If the teacher's approach is too authoritarian, not only is the self-conscious adolescent discouraged from the active oral participation essential to effective language learning, but when this type teacher is seen to be in error, he tends to lose that confidence of the pupil which may be the only effective motivating force remaining in operation.

The adolescent who is called upon to stammer out the first words learnt in a foreign language is most likely to experience a feeling of embarrassment, especially if the incongruity of the unfamiliar sounds appears slightly ricidulous to himself and his compeers. It is likely that the pupil will become discouraged and bored if the insecure teacher does not resist the temptation to side with the group at the expense of the individual. One way of overcoming this type of difficulty is to make use of dramatization involving the whole group. This requires mutual co-operation, ensuring that the individual pupil is not the centre of curiosity. A number of books of graded playlets have been published in recent years, and some of the more recent course books contain texts in dialogue form, suitable for dramatization.

(*c*) *The Learning Process*

The factors discussed above are among the more important general ones governing learning and teaching foreign languages. It is beyond our present scope to attempt a reconciliation of learning theories, but some mention of their common basic aspects can be accepted and applied to the modern language class to help to crystalize the roles of the intellectual and emotional factors discussed above. These would suggest that, whereas a very young child might learn a modern language simply as a response to a social situation and as a set of demands to communicate, the adolescent child—more frequently the kind of pupil in modern language classes at the moment—might question the utility of the study and hence would require more positive motivation on the part of the teacher.

In the learning process, the effects of frequency, recency and exercise are especially apparent in oral work, which requires constant practice and repetition to form and retain the habits necessary for speech. The same process appears applicable to the learning of grammar, and it is in this sense that the newer concept of mental discipline, involving the formation and strengthening of correct responses or habits, is seen to operate. Language learning also requires the use of the intellectual processes of spontaneous analysis and synthesis of the course material and of speech in constantly different situations. If the curiosity and interest drives of the adolescent do not find an outlet in spontaneous and varied activity beyond the mere formation of habit, a powerful potential source of motivation in fact merely adds to his conflict, which in turn limits the use of positively motivated activity methods.

The effective presentation of linguistic material to the pupil requires grading according to difficulty to ensure efficient assimilation. In this, regard must be had to the total burden imposed by the introduction of each quantity of new material, so that the introduction of new grammar points together with new text material is avoided. Unfortunately, this difficulty of excessive burdening is still encountered in some texts. It may arise partly from a desire to present new and hence potentially more interesting material with each section of the course book, but in practice it seems frequently to defeat the purpose of maintaining interest because it necessitates spending a prolonged period on the same material, even on the same page, and leads to boredom and the grammar grind. The practice of including a separately printed grammar section together with exercises after each comprehension passage in the foreign language text does not seem entirely to obviate this difficulty, since either the grammar material must be used at the same time as the comprehension passage, thus increasing and complicating the learning burden, or its use must be delayed until the context is " stale " and interest motivation is lost. One solution is to provide text material in which the vocabulary remains the same for the comprehension, grammar and exercise sections, but which contains new narrative in each section, without introducing extensive new vocabulary until the grammar has been mastered and practised. This tends to minimise resistance produced by consolidated mechanical and automatic drill, which, though essential, do not appear so burden some. It also provides a more interesting way of doing revision. This is in no way to minimize the need to repeat and practice the mechanics of the language to the point of overlearning, particularly in the early stages of the course, but it does take account of the emotional factors involved in the learning situation.

Conclusions

This initial survey is concerned with a consideration of the general problems affecting the teaching of modern languages, particularly in the English Secondary School. A later one will take into account some of the research work which has already been completed and which bears on these problems, particularly regarding the prediction of success and the measurement of attainment and importance of personality factors in modern language courses. It is apparent that there is still a great deal of objective investigation to be done before the major difficulties encountered in language teaching have been fully evaluated. First, it seems necessary to avoid the tendency to think of the systematic methods, such as the Direct or Oral Methods, as coherent wholes based on objective evidence. It would also seem necessary to make some reliable estimate of the foreign language burden, at least as far as English language background is concerned. Leaving aside the question of the objective measurement of aesthetic abilities in the literature papers set in public examinations, it would also seem highly desirable to prepare and use more standardized attainment tests in all the languages commonly taught in our schools. It would also be helpful if, at the same time, the opportunity were taken to press for a revision of the form in which syllabuses for language papers in examinations are defined. A basic word list might perhaps be provided at, say, the Ordinary Level of G.C.E. and structural difficulties approached in an order of graded difficulty which would also have to be established objectively. These latter points will take time, but there is nothing to stop the interested teacher going ahead with the preparation of standardized attainment tests with the methodological and statistical help of his area University Institute of Education, if such facilities are available there.

Bibliography

Board of Education. *The Education of the Adolescent.* London: H.M.S.O., 1927.

Findlay, J. J. " The Psychology of Modern Language Learning." *B. J. Ed. P.*, Vol. II, 1932.

Gilbert, Mark, " The Origins of the Reform Movement in Modern Language Teaching in England.' *Dur. Res. Rev.*: Part I, No. 4, Sept. 1953; Part II, No. 5, Sept. 1953; Part II, No. 6, Sept. 1955.

Halloran, J. H. " Esperanto as an Introduction to French." *B. J. Ed. P.*, Vol. XXII, Pt. III, 1952.

Jones, W. R. "The Language Handicap of the Welsh-speaking Child." *B.J.Ed., P.* Vol. XXII. Pt. II, 1952.

Jones, W. R. " Welsh as a Second Language." *B. J. Ed. P.*, Vol. XIX, Pt. I; Vol. XX, Pt. II.

Ministry of Education. *Modern Languages.* London: H.M.S.O., 1956.

Neale, L. W. " The Development of Reading Ability in French and its Measurement in the Grammar School Course. *Dur. Res. Rev.*, No. 4, Sept. 1953.

Ormiston, Mary. " The Learning of General and Special Abilities on Scholastic Success at the Beginning and End of a Secondary School Career." *B. J. Ed. P.*, Vol. IX, Pt. II, 1939.

Penfield, W. "A consideration of the Neuro-physiological Mechanisms of Speech and some Edncational Consequences." *Amer. Acad. Arts and Sciences, Vol.* 85, *No.* 5.

Petch, Y. A. " A Comparison of Orders of Merit of H.S.C. Candidates Offering Two Modern Languages." *B. J. Ed. P.*, Vol. XV, Pt. III.

Robson, Winifred F. " The Vocabulary Burden in the First Year of French." *B. J. Ed. P.*, Vol. IV, 1934.

Strevens, P. *Aural Aids in Language Teaching.* London: Longmans, Green & Co., 1958.

The Incorporated Association of Assistant Masters in Secondary Schools. *The Teaching of Modern Languages.* University of London Press, 1952.

Unesco. *The Teaching of Modern Languages.* Ceylon: Unesco, 1953.

Valentine. *Psychology and its Bearing on Education.* London: Methuen, 1950.

BILINGUALISM IN WALES: AN ASPECT OF SEMANTIC ORGANISATION

by Cyril B. E. James

Senior Psychologist, Carmarthenshire L.E.A.
Consultant to Pembrokeshire and Cardiganshire

Bilingualism—A Vital Issue

THE Report of the Central Advisory Council for Education (Wales)—" Lle'r Gymraeg a'r Saesneg yn Ysgolion Cymru "—" The Place of Welsh and English in the Schools of Wales " is only one of a series of documents drawing attention to the problems of bilingualism in Wales. " The study of bilingualism," says the report, " is of considerable general interest, especially to psychologists, sociologists and students of education. But in Wales, on account of the great danger in which the Welsh language finds itself, bilingualism has more than a general or academic interest; it has become a matter of national concern."

Wales is a country with a language of its own and a literature which has a history of over a thousand years, but it is, nevertheless, linked to England by geographic, economic and political ties. In the Principality, the two languages, English and Welsh, exist side by side. Hence, educational policy has rightly been based on the acceptance of both. The Central Advisory Council for Education (Wales) suggests that the primary school should safeguard the home language of the child and encourage its use as a medium of his education, whilst the second language should not be taught formally until the child has left the infants' school. Emphasis is also placed on the necessity to ensure continuity of policy between primary and secondary schools in the same area, with regard to the teaching of the two languages and to their use as a media of instruction.

In a debate in the House of Lords (November, 1958) a former Colonial Secretary, Lord Ogmore, pointed to the wider significance of bilingual policy, not only in Europe, but in Asia and Africa. One of the most vexed questions, he said, with which statesmen have to deal is that concerning the stage at which the vernacular language should be taught and when one should teach the international languages—English, French or whatever might be the tongue of the colonial power.

As far as Wales is concerned, Lord Brecon, Member of State for Welsh Affairs, said during the same debate, that of the seventeen local authorities, ten had adopted the Central Advisory Committee's policy on bilingualism, two had a modified policy, and five had no policy at all. The magnitude of the problem becomes apparent when it is realised that of a total population of two and a half million, according to the last census, 714,000 (nearly a third of the population) speak Welsh.

Definitions of Bilingualism

For research purposes the complexity of the problem must be recognized in any definition. The Advisory Council states: " Bilingualism implies the simultaneous learning of, though not necessarily an equally proficient control over, two languages by an individual child, sometimes from an early age, on account of compulsions within his social environment."

This definition, however, needs amplification. Bloomfield defines bilingualism as a " native-like control over two languages "; and Leopold extends this definition further and states that " Bilingualism is the ability to speak two languages which are spoken equally well for all purposes of life. In practice only approximations to this ideal can be expected. Bilingualism is a fact even when one language is spoken better and more extensively than the other, as long as both are regularly employed as media of intercourse."

Broad grades of bilingualism are readily distinguished. Saer, at an International Conference on Bilingualism in Luxemburg, divided them into three bilingual types and monoglot. The monoglot are children who have no effective comprehension of a second language. Except among very young children, it would be difficult to find such children in Wales. The lowest degree of bilingualism is shown by those who comprehend simple questions in the second language but fail to make use of it in their answers. Next come the average bilingualists who possess a good comprehension of the mother tongue and a good degree of facility in using it, together with a lower ability in using and understanding the second language. Finally, there are the bilingualists who speak their mother tongue regularly and take enough interest in it to read it, but who have also arrived at a good degree of facility in speaking the second language and make good progress in reading and writing it.

However, even within such gradations, there are a number of diverse elements which must be differentiated. In thinking of any particular child or group of children in a bilingual situation, we must take account of such things as the effect of intelligence, age and method of acquiring the languages, the type of linguistic background of the home, the school, and particularly the playground, the attitude of the child and of those with whom he is in close contact towards the second language, his socio-economic level, as well as the educational, religious, administrative and political influences which affect him both directly and through the effects of broader issues of local policy.

Clearly, too, bilingualism is an additional hazard of which account must be taken when attempting to assess the personality and the potentialities of a child. It is at this point that some research workers have confused the issue by attempting to apply purely statistical techniques (rather than experimental) in order to partial out the effect of certain of the variables under discussion. Not the least among the difficulties which the research worker has to face is, in fact, the effect of varying degrees of bilingualism (within the environment and in the child himself) on the semantic organisation of different children. These differences, which are reflected in mental functioning and structure, can hardly be dealt with by mainly statistical means. We are faced with the same order of problem as makes cross cultural research difficult.

Problems of Research into Bilingualism in Wales

From the point of view of the research worker in Wales, then, the factor of bilingualism, complicated by the varying degrees of linguistic facility achieved by various children ranging from high to low intelligence and affected by different socio-economic influences, makes it extremely difficult to design an experiment to ascertain the most effective method and curriculum for teaching any particular bilingual child.

It is, however, evident that research into the problem of bilingualism is important for teacher and the psychologist, for the administrator and the medical officer, if indeed education and guidance are to be employed to the best advantage of Welsh children. But it is well to remember that language serves but as a vehicle to convey the cognitive, conative and affective expressions of the individual, that the individual himself may, in turn, be subject to a variety of influences which promote or inhibit the development of his personality, and that the degree with which he will cope successfully with his environment will depend on his emotional development and the functional level of his intellectual capacity to overcome any socio-economic or other difficulties which he may have to face.

Under the direction of Professor Idwal Jones the Collegiate Faculty of Education at Aberystwyth published " A Review of Problems for Research with Bilingualism and Allied Topics " based on the investigations by the research assistant (Dyfnallt Morgan) into the schools of the Faculty area and the detailed work of the former advisory officer (A. Pinsent). The preface states that not only should this statement serve as a programme of work for the Collegiate Area as opportunities arose, but as a " blue print " for all research work connected with bilingualism in Wales. So much has been written in purely general terms about two-language teaching and learning, and so little exact work done, that a planned layout of the problems involved is timely and salutary and workers in the field will be helped to find specific projects and to see how their work might be co-ordinated.

So detailed are the recommendations of this pamphlet and so imaginative its suggestions for topics of research that a summary would not do it justice. However, the following may be helpful to the general reader. In brief, it states, the scope of research work might legitimately include experimental investigations, surveys of conditions as they exist at the present time, historical studies, and the collection and arrangement of bibliographies and other source material for ready reference by research workers and teachers. Among the many topics for research, the pamphlet suggests the following:

(*a*) the need to construct the necessary " tools " for investigation, such as standardised tests of reasoning, attainment and attitude.

(*b*) Studies requiring the use of such special research " tools," including:

  (1) Definition of concepts. Case Studies.
  (2) Studies of intelligence test performance in relation to degree of Welsh linguistic background.
  (3) Studies of development of educational attainment in relation to Welsh linguistic background.
  (4) Surveys or studies to determine the comparative efficiency of alternative methods of language teaching.
  (5) Studies of " language mixture " and its effects on learning.
  (6) Methods of selection for, and allocation to, types of secondary education in mixed language areas.
  (7) Studies of attitudes and incentives in connection with teaching and learning Welsh/English.

(*c*) Investigations not requiring special research tools—ranging from studies of word frequencies to the curriculum, methodology, and sociological background of the schools.

Though not exhaustive this list of problems does enable the student of semantic organisation to have the right perspective in regard to his particular field of work.

Optimum Age for Introduction of Second Language

Not the least among the problems is one which has obsessed students of language teaching generally: that of the best age at which to begin teaching a second language. Drever, in his monograph on *Early Learning and the Perception of Space*, introduces the crux of the problem by pointing out the distinction drawn by Hebb between early and late learning, he suggests, organisation occurs in the non-specialised cortical areas and this organisation acts as a basis for perceptual skills and insights, upon which the later learning in part depends. Though of wide generality, this suggestion is not merely speculative. It can be used to make predictions about subjects who have or who have not had opportunity for certain kinds of early learning. Piaget confirms Drever's statements on the importance of studying the relationships between perception and intelligence and suggests that there are three main principles involved: " On peut réduire à trois grands types, les diverses interprétations que l'on a proposées quant aux relations entre la perception et l'intelligence: action directrice de l'intelligence ou continuité entre deux modes analogues mais distincts et successifs de composition."

Penfield goes further and states that there is an age when the child has a remarkable capacity to utilize these areas of the cerebral cortex for the learning of language, a time when several languages can be learned simultaneously as easily as one language, and that later, with the appearance of the capacity for reasoning and for abstract thought, this early ability is largely lost. " He who is mindful of the changing physiology of the human brain might marvel at educational curricula. " Why," asks Penfield, " should foreign languages make their first appearance long after boy or girl had lost full capacity for language learning? " Briggs, speaking from his teaching experience in North and Mid-Wales, suggests that children should begin to learn foreign languages at the primary level. Williams,* Area Advisory Officer to the Collegiate Faculty at Aberystwyth, in an article " Two Languages in School " (Y Ddwy Iaith Yn Yr Ysgol) goes further and states that the second language should be taught before the age of seven. He is of the opinion that children whose mother tongue is English would be more successful in learning Welsh if much more time were given to the teaching of that language before the child was seven years old, in order to induce them to play and live in the atmosphere of the Welsh language, at the ages of four to seven, particularly if the mother tongue has already been established.

It would seem that many experienced workers from other countries also believe the early teaching of a second language to be a prerequisite if a child is to become truly bilingual. If true, this basic assumption is important in such countries as Wales, where there is a need to foster bilingualism both in order to broaden the personal development of the individual and to effect his closer relationships with those of his own kin and tradition as well as with those from different linguistic culture. It would be more broadly important also in a time when the governments of Europe are seeking to co-ordinate their economic planning in terms of " six group " and " seven group " multilingual and multiracial communities.

---

*Jac Williams : " Tybed a fyddai'r llwyddiant a geir gyda'r plant bach yn llawer mwy pe rhoddid cryn dipyn of amser at ddysgu'r Gymraeg iddynt cyn eu bod yn saith oed, gan eu harwain i chwarae ac i fyw yn yr iaith Gymraeg pan fônt yn 4·7 oed, os yw eu mamiaith yn sefydlog."

Bilingual Education in Various Countries

In the foregoing discussion we have noted the multiplicity of factors which must perforce be taken into account in assessing the efficiency of a bilingual policy in Wales. *Mutatis mutandis*, similar educational problems are present in other countries where two languages and two cultures exist side by side. Hence, a better perspective of the total picture is gained by paying some attention to aspects of bilingualism in other countries and at the same time bearing in mind that small " linguistic islands " occur in the larger cosmopolitan cities of the U.S.A. and elsewhere.

O'Doherty, writing on the Educational Aspects of Bilingualism in Ireland, has stated that the difference between the Irish situation and that of Wales, the Scottish Highlands, the Belgian Walloons, Spanish Catalan-speaking children and of Breton-speaking children in France, is that the plan for bilingualism in those countries rests primarily on consideration of the child's welfare and on sound psychological principles. This is given expression, for example, in the principle enshrined in the Belgian constitution, Article 20: " Dans toutes les écoles communales adoptées ou adoptables, la langue maternelle des enfants est la langue véhiculaire aux divers degrés de l'enseignement." In *Ireland*, however, states O'Doherty, " in one sentence, what it comes to is this, our present pseudo-bilingual policy is based on emotional, political and historical factors, to the neglect of pedagogical, psychological and social considerations." On the other hand, Domhnallain, Inspector of Schools, testifies to the success of the bilingual educational policy in the twenty-six counties of Eire. As a result, he says, there is no doubt that an astounding degree of success has been achieved in restoring the Irish language in the schools, even if no comparable success has been achieved in reviving it outside the educational system.

The nature and background of bilingualism in *Finland* has been the subject of a article by Denison, who describes how Finnish and Swedish flourish side by side in the face of political pressure from Russia. He concludes, that of Finland it is certainly true to say that the cultural pressures played a greater part than the political, though it would be difficult to say whether the rise of linguistic and cultural patriotism in Finland would have been as spectacular, or indeed possible, without the accident of political separation from Sweden. From the point of view of national psychology, it is of interest to note that the period which saw the most rapid development and the most intense cultivation of Finnish, during the years preceding 1900 and continuing up to the first World War, coincided with the Czar's efforts at Russification.

A situation report on linguistic organisation in *South Africa* by Libenburg, Chief Inspector of Schools for Cape Town, indicated that the variations and combinations occurring at the various levels in the class structure of school administration in order to foster Afrikaans and English, is such that pupils become so proficient in their understanding of both languages that it is immaterial to them afterwards through which language the instruction is given.

In *Belgium*, the policy is that French and Flemish have equal status and " the legal position is that the head of the family shall decide which of the languages, French or Flemish, is the mother tongue or habitual language of the child; but this decision may be set aside by the school, the State Inspectorate, or an official linguistic commission who have the power of modifying the effect of the decision made by the head of the family."

In *Switzerland*, the four official languages are German, French, Italian and Romansh. Language teaching is of particular importance, since professional and business men at least find that a minimum facility of comprehension in the three main official languages is essential for ease and efficiency in their work. In addition, English is considered an essential part of their linguistic equipment.

Multiplicy of Influences other than Linguistic on Educational Methodology

It will not be out of place to remind ourselves for a moment that a multiplicity of influences other than the linguistic affect the development of personality and that bilingualism, as such, is but one among many influences which affect a child's educational progress and mental health.

Thomson points out that, " growing up, as we do, into a society speaking one mother tongue and daily using thousands of phrases and catchwords which imply judgments we are very liable to acquire the phrases and catchwords without any real consideration of the judgments involved. So we become little Englishmen, or Frenchmen, Turks or Prussians; so we become little Liberals and little Conservatives."

The Welsh Department of the Ministry of Education, speaking of the special characteristics of Welsh Culture, stresses the wider influence " that each country reveals in its beliefs, manners, customs and literature; elements that are peculiar to it alone. It is by developing these, by creating conditions whereby the best that lies in the particular genius of the nation can flourish." Hence, research into the influence of bilingualism in child development involves the student in an appraisal, not merely of the relative effects of socio-economic emotional and intellectual factors in addition to the linguistic, but in an analysis of the very culture itself that shapes the structure of his thought and beliefs.

Implications of Special Educational Treatment for Bilingualism

The relationship between the growth of language and the growth of concepts and hence between bilingualism and intelligence must loom large in the mind of the research worker, particularly in regard to arrangements for suitable educational treatment for exceptional children. The education of the mentally handicapped child, for example, raises the problem of how far should such children pursue any formal study of a second language.

The emotional factor also bears strongly on the problem of bilingualism, for often children who are disturbed find difficulty in expressing themselves and in making progress at school. Their whole development is adversely affected by the inhibiting influences of a social or emotional handicap. Maladjusted children who suffer from nervous, habit and behaviour disorders are difficult to assess since the functional level of their performance varies with degrees of impairment.

It will be seen, therefore, that when carrying out research into bilingualism in Wales any aspect of semantic organisation may be obscured by influences other than the purely linguistic. Account must, therefore, be taken of the physical, emotional, intellectual, educational and social development of that 10-15 per cent. of children who, in one way or another, deviate markedly from the normal. The sample of population chosen for investigation, therefore, must allow for this as well as being a representative cross-section of groups varying from the monoglot to the fully bilingual.

Functional Level and Underlying Structure of Intelligence

In view of the many factors that produce variable results in the testing of a child's reasoning power and attainment, it is suggested that it would be better to speak of the " functional level of intelligence " rather than of the " intelligence estimate (I.Q.)," *per se*. Such a concept enables teachers in the classroom and psychologists during their clinical examinations to keep an open mind about the results obtained from tests whether they be group or individual.

Much of the controversy concerning variations of test scores (as a result of coaching, or the effect of environment as opposed to heredity, or urban as compared with rural background, or bilingual performance as contrasted with monoglot accomplishment), appears to spring from two main sources. There may be a considerable difference between a child's performance on a group test of ability or of scholastic attainment and the estimate arrived at from clinical tests administered individually. In constructing a range of items for a test, one tries so to arrange them that differentiation is possible between levels of thinking, shading gradually from the simple association of ideas at the perceptual level to relational thinking at the perceptual level and subsequently to conceptual thinking at the abstract level. As the present writer has pointed out in his critique, " Bilingualism and Non-Verbal Reasoning "—when attempting to assess the personality of a child (or children) for purposes of research, or with a view to educational guidance, one would do well to be careful in one's choice of measuring instruments, particularly before arriving at broad generalisations which may have practical implications in the field of educational policy. Data which are both quantitative and qualitative can be equally valuable in reaching conclusions, whether such data be based on the results of group tests or teacher's estimates, on the one hand, or on the individual test and clinical examination on the other. In psychological science quantitative accuracy is a relative term for no child can be reduced to a statistic.

Much of value can be obtained from the studied use of statistical method, but the value can be enhanced by the cross-fertilisation of the quantitative—scholastic and the qualitative—therapeutic techniques through including both nomothetic and ideographic procedures. Only then can one make an adequate analysis and synthesis of relevant aetiological factors of the case which may be followed by a tentative diagnosis. This holds true whether we apply our techniques to the assessment of pupils with a view to " streaming " within classes, transferring them from primary to various types of secondary schools in Wales, or to the ascertainment of handicapped pupils in need of special educational treatment. In such circumstances one would use a variety of test instruments and weigh in the balance a multiplicity of factors including the influence of degrees of bilingualism as opposed to bilingual background.

Morrison sums up in relation to Gaelic and Welsh-English bilingualism in the following way. He states that educational guidance, a difficult, skilled and chancy task even in the best conditions, is doubly so in a bilingual region. It is a task virtually impossible to discharge satisfactorily without the following desiderata:

(i) a knowledge of the children's vocabulary in both Welsh and English, at various ages but especially at the age of 11-plus;

(ii) a measure of bilingual background, probably on the lines of the Hoffman Schedule, adapted and validated for the specific bilingual situation;

(iii) tests of capacity and attainment adapted or specially devised and standardised or re-standardised on children of varying degrees of bilingualism as measured by (ii);

(iv) some at least of the tests to have no time-limit.

It appears, too, from the above, that the technique of language teaching is of vital importance to the communities concerned, and as Thomas has pointed out, the administrator's approach to the implementation of bilingual policy is particularly important since it is on a successful linguistic policy that the system of educational and vocational guidance is based.

A bilingual policy implies the intention to maintain if not increase the number and proficiency of those speaking both languages. As may be seen by the remark earlier cited from Eire, this does not apparently depend solely upon educational policy, important though this is. Confirmation comes from two studies of incidence. One by Jennie Thomas, surveying Caernarvonshire in 1952, noted that no significant change in the language pattern of the county has taken place since the surveys of 1944 and 1948. She reported that the maintenance of the Welsh-speaking percentage at a uniformly high level in spite of the powerful anglicising forces which were potent throughout the county, could be attributed to two vital factors. The first was the bilingual policy enunciated by the L.E.A. and carried out by successive Directors of Education in association with generations of teachers. The second she attributed to the widespread, virile social and religious life which existed in all cultural institutions in both urban and rural areas. The existence of this strong social influence was reflected in the local and national press and ultimately in the live Welsh language spoken in the majority of the homes.

In South Wales, however, the opposite tendency has been noted by Davies who, in his work on " The decline of the Welsh language in a sample of the Faculty area," stated that there had been a continued deterioration in the position of the Welsh language in the communities concerned. There had also been a similar decline in the power of the Welsh cultural agencies, particularly in the areas of the greatest concentration of population. Many causes had been enumerated for the disappointing results of the teaching of Welsh in schools as a second language—the shortage of adequately trained teachers, lack of enthusiasm, faulty methods and the supremacy of the English language outside the classroom. Serious thought would have to be given to this aspect of language teaching, if bilingual policy in the schools is to achieve any measure of success: but it would be foolish to neglect also the interaction between language teaching and learning and the general quality and liveliness of the surrounding culture.

Earlier work on psychological aspects

Most of the research work by Welsh scholars into the psychological aspects of bilingualism had been concerned with testing the mental development of bilingual children, especially with the significance of the verbal factor and the attempt to determine whether bilingualism adversely affects intellectual growth. Early investigations in this field were conducted by Saer, Smith, Barke and Parry Williams. Their methods and results, which suggested some inferiority on the part of bilingual children, were generally accepted in the past, but recent investigators have criticised them for various reasons. It has been maintained that some of the tests were inappropriate and that the results were not always interpreted accurately. Moreover, no assessment of the bilingual background of the subjects was made to ensure reasonably uniform groups, and the statistical treatment of the data was by contemporary standards inadequate. Later investigations in the same field by Jones working alone, and in collaboration with Stewart and also by James, have attempted to avoid these errors. But the paucity of the results from Wales and the lack of consistency among them obliges one to agree that there are few firm conclusions and fewer conclusive arguments so far to be drawn from Welsh evidence.

Evidence from investigators in other bilingual countries needs cautious interpretation in the light of Welsh conditions. However, after a study of the work of men like Gali, Hoffman, Pintner, Prescott, Malherbe and others, the writers of the report on " The Place of Welsh and English in the Schools of Wales " finally agree with Arsensian, who remarked, " Bilingualism, that is the simultaneous learning of two languages from infancy, has no detrimental affect on the child's mental development provided: (*a*) that at the earliest stages of the child's language development a consistent method of source and presentation of the two languages is observed, that is, ' une langue, une personne '; (*b*) that psychological barriers or negative conditions such as inferiority or superiority of the language involved, or national or religious animosities are absent; and (*c*) that the languages are learnt by spontaneous informal or play methods and not by formal or task methods." The reader who wishes to pursue his interest further should refer to the detailed statement in the report of the Central Advisory Council for Education (Wales), including the discussion of research work on some of the psychological considerations in relation to bilingualism.

Current Researches involving Bilingualism

Within a limited compass it is not possible to give an exhaustive account of current researches in the field of bilingualism in Wales and we will, therefore, confine outselves to four main trends of investigation, namely:

(*a*) the study of Welsh semantics;
(*b*) test construction;
(*c*) the application of psychological techniques to secondary allocation;
(*d*) the effect of bilingualism on educational attainment.

(*a*) *Semantic Organisation*

In addition to its broader research programme outlined above, the Faculty of Education at the University College of Wales, Aberystwyth, under the leadership of Professor Idwal Jones, J. R. Morrison and Jac Williams, is applying the technique of linguistics to a study of the Welsh language. It is hoped that this study will facilitate the work of teachers of Welsh in English-speaking areas of Wales. A more or less complete classification of commonly-used words, according to their morphological pattern, is aimed at and syntactical forms are being studied with the intention of proceeding with the grading of sentence patterns. This basic and essential analysis and classification of word-forms and sentence structure should put the teaching of Welsh as a second language on a sound foundation and enable teachers to practice approved modern methods of presentation in a classroom.

(*b*) *Test Construction*

In the field of test construction, progress has been made in several directions. In Pamphlet No. 3 of the University College of Aberystwyth, Department of Education, Pinsent describes " The Construction and Use of Standardised Tests of Intelligence and Attainment "—with special reference to problems of a mixed language area.

In the Department, several group tests of intelligence and Welsh attainment have been, or are, in course of being standardised:

(i) A Welsh Word Recognition Test by J. L. Brace (Pamphlet No. 5).
(ii) A Welsh Intelligence Test (Prawf Deallusrwydd).
(iii) A Welsh Attainment Test (Prawf Iaith Gymraeg).
(iv) A Welsh Linguistic Background Scale by Gwenda Rees.

Work of this nature at Bangor University College also aims at assessing various aspects of Welsh as a school subject. Tests of attainment and non-verbal reasoning have been constructed for this purpose by Jones.

The Carmarthenshire Local Education Authority, in conjunction with the N.F.E.R., has produced a Bilingual (English/Welsh) version of a N.F.E.P. Non-Verbal Reasoning Test administered and standardised by James and Pidgeon over the complete eleven-plus group of the county.

Under the aegis of the North Wales Child Guidance Clinics, Morgan, Williams and Simmons, in consultation with Peaker, are proceeding with the development of standardised tests suitable for grading and assessing children in the classroom. Of particular interest is the work on the adaptation of the W.I.S.C. for use with Welsh-speaking children. This project has now reached the stage where three preliminary drafts of verbal items have been administered to a random sample of approximately 300 children, and as a result of item analysis, the first draft of verbal items on the basis of " difficulty " and " discrimination " values has been prepared. In addition, the non-verbal scale is complete in its provisional form. Thus, the first full but still provisional version of the complete scale (verbal and non-verbal sections) can be used with a random sample of approximately 1,000 children for final standardisation in 1960.

An *Oral Language Questionnaire* has also been constructed for individual use in order to determine whether a testee shall be tested in Welsh or not. This is necessary as no other satisfactory method for selecting the most suitable language is available.

This questionnaire was tested on two occasions on two representative and random samples of the primary school population of North Wales, about 550 children being interviewed individually. The test sample was selected on the basis of an enquiry form circulated to head teachers with the assistance of the local education authorities. The information thus obtained provided up-to-date details of the number of Welsh-speaking children in North Wales, stratified according to age, sex, class and school. On the basis of this information a sampling scheme was drawn up and a random sample was made of schools for the purpose of testing test items. The answers were subsequently analysed in detail and the results so far obtained give grounds for hoping that the final form of the questionnaire will be both accurate and reliable.

(*c*) *Allocation to Secondary Schools*

Not the least among practical problems of an L.E.A. when it seeks to implement a bilingual policy is the question of the allocation of pupils to secondary schools. If, indeed, in the words of the Carmarthenshire L.E.A., we hope to establish a system of educational guidance merging gradually into a form of vocational guidance which will enable pupils at any stage in their school career to make the most of opportunities afforded to them, then the differential effects of each child's linguistic background must be taken objectively into account. Thus, as well as the usual practice to allow for age and possibly sex differences, one has to partial out the effect of various influences in linguistically mixed areas.

In Carmarthenshire, in 1958 a Pilot Scheme was tried out and proved satisfactory. The head teachers' assessments (order of merit lists) scaled by means of a Bilingual Version of a Non-Verbal Reasoning Test in accordance with the technique proposed by Yates and Pidgeon, taken together with external tests in Welsh, English and Arithmetic, proved to be an excellent criterion for the allocation of pupils to secondary schools. Order of merit lists from seventeen schools were taken at random, from various areas throughout the county, ranging from complete first language English, through linguistically mixed schools, to first language Welsh schools, and the results were analysed by the N.F.E.R. The correlations between the order of merit lists and the total external examination scores proved to be highly significant in their degree of agreement in rating the abilities of children.

It is important to note that the specially adapted Non-Verbal Test, with bilingual instructions in English and Welsh, proved to be a useful scaling instrument because it had a reasonable positive correlation with attainment and teachers' judgments, particularly in view of its consistency within each school, where the scores were distributed over the same range as the examination marks.

(*d*) *Bilingualism and Educational Attainment*

Earlier research workers concerned with the influence of bilingualism on the intellectual and educational development of children tended to confine their work to a more or less descriptive and literary approach to the problem. Some, however, studying attainment by more or less objective means, came to the conclusion that bilingual children tended to have a somewhat lower level of attainment, especially in reading.

The present writer made a " Comparative Study of General Performance Between Bilingual and Monoglot Children in South Wales " (1947) and used the statistical technique of Analysis of Variance in an attempt to partial out various influences which might affect test results and to isolate the effect of the " bilingual factor." His basic purpose was to try out a careful experimental design which might be adapted for use on a wider scale. The technique allowed him to study the differences, if any, between the performances of graded groups of bilingual and monoglot children. His tentative conclusions were that pupils of high intelligence profited from a bilingual educational policy, children of average mental capacity did not appear to be adversely affected by it, but that slower learning children and those who were mentally handicapped experienced augmented linguistic difficulties when attempting two languages. If these conclusions are true, it would seem that there is need for a modified " language of the hearth " policy for such pupils. Further, on the assumption that bilingual and monoglot groups are equally intelligent initially, we must emphasise the need to assess the relevant socio-economic influences before weighing the effect of bilingualism in the balance of educational attainment.

A similar experimental and statistical technique was employed by Jones (but without taking account of the assumption as to initial intelligence levels) in his work " Language Handicap of Welsh-speaking Children: a study of their performance." Subsequently, the same technique was used by Jones, Morrison, Rogers and Saer in their research on " The Educational Attainment of Bilingual Children in Relation to their Intelligence and Linguistic Background." Their main findings were: (i) that variations of language conditions, as a result of introducing a second language, do not (as one might expect) have an adverse effect upon Mechanical Arithmetic and only a moderate one on Problem Arithmetic administered in English; (ii) that the performance of predominantly Welsh-speaking children in English reading and usage is not equal to that of the predominantly English and Mixed English groups between ten and eleven years of age, but that the Mixed Welsh groups did not compare unfavourably with the English groups in this respect; and (iii) that the level attained by the Mixed Welsh group in Welsh reading and usage was significantly lower than that of the predominantly Welsh-speaking group at this stage.

These conclusions are described by the authors as tentative. It must also be stated that there were certain weaknesses in the design of the experiment. Jones, in his most recent work, " Bilingualism and Intelligence, 1959," tends to accept the assumption of the present writer that " various groups of monoglot and bilingual children do not differ significantly in intelligence, provided that they are also of similar socio-economic status as indicated by parental occupations," and he concludes that bilingualism, as such, need not have an adverse effect on performance in a non-verbal test of intelligence. Furthermore, the findings on this third occasion also suggest that the significant differences in non-verbal test scores observed between the four linguistic groups on the other two occasions arise from occupational rather than linguistic variations between the groups, since variations of the latter kind were equally present on each of three occasions.

Apart from indicating that bilingualism is not necessarily a source of intellectual disadvantage, the study of Jones and his collaborators has drawn attention to the influence of socio-economic factors in comparisons between groups of monoglot and bilingual children and has emphasised the importance of such factors in the correct interpretation of test results. Hence, many of the comparisons made in Wales and elsewhere between monoglot and bilingual groups, if they have omitted to allow for this important influence, must be regarded with great caution.

The Future of Bilingual Policy

What of the future? We may quote Jac William's remark that " it is probable that consciousness of being Welsh has existed in the Principality ever since the inhabitants of Wales were separated from those of Cornwall and Cumberland as the result of Anglo-Saxon penetration to the West Coast of Britain in the sixth and seventh centuries A.D. . . . but in recent years there has been an increase in national consciousness . . . and there has developed a general pride in having a national language and general desire to keep it alive." He ends by saying that: " At the present time it appears that the bilingual society to be found in Wales is in the process of developing norms, behaviour patterns and goals, that may enable a state of linguistic equilibrium to be achieved in a stable bilingualism and so enable the national language of Wales and the culture that is associated with it to survive."

The ever-present problem of bilingualism can, then, be considered from two points of view: the first from the relationship of the actual performance of the child and the functional level and underlying structure of his intelligence, and secondly from the less tangible effect of " Sprachmischung " (Admixture of Languages) on the one hand and " Kulturmischung " (Overlapping of Cultures) on the other, on the outlook of the individual and the general development of his personality.

The University of Wales is also seeing this problem in a new light and is encouraging the bilingual policy by, for example, making appointments in some of the Arts Faculties of lecturers to teach through the medium of Welsh. Likewise, the Welsh Joint Education Committee set up a panel in 1956 to handle bilingual teaching in the Secondary schools and to suggest methods by which the continuation of the bilingual training for children attending primary schools where Welsh is the first language should be developed and furthered.

It would not be inappropriate to end on this note by quoting the Welsh Department of the Ministry of Education on the problem of Educational Guidance in Wales. " Investigations to discover the most appropriate forms of school record cards and of diagnostic tests for use in Wales, where the language differences complicate the problem of standardisation, should be undertaken immediately. The need for such research is urgent for on its result will depend not only the possibility of an adequate educational guidance service in Welsh Secondary Schools, but also the eventual development of an effective system of vocational guidance for the youth of Wales."

We may, perhaps, hope that the forthcoming National Survey for Wales, to be conducted by the Welsh Joint Education Committee and the N.F.E.R., will provide some of the information necessary for these purposes.

Bibliography

Bloomfield, L. *Language.* New York, 1933.

Brace, J. L. *A Welsh Word Recognition Test.* Pamphlet No. 5, Univ. Coll. Wales Fac. of Ed.

Briggs, E. R. " Acquiring a Second Language: New Light on the Problem," from Cités-Unies, *Le Monde Bilingue:* No. 9, November, 1958, pp. 26-27.

Carmarthenshire, L. E. A. " Keeping Open the Door of Educational Opportunity." Carmarthenshire Local Education Authority Policy Statement, 1958.

Davies, J. A. " The Decline of the Welsh Language in a sample of the Faculty Area." *Bulletin No.* 6, Univ. Coll. Aberystwyth Fac. of Ed.

Denison, N. " The Nature and Background of Bilingualism in Finland." *Bulletin No.* 3, Coll. Fac. of Ed., Aberystwyth.

Drever, J. " Early Learning and Perception of Space." *Am. Journ. Psych.*, Vol. 68, No. 4, 1955.

Hansard. *Parliamentary Debates: House of Lords Official Report: 26th November,* Vol. 212, No. 14, 1958.

Hebb, D. O. *The Organisation of Behaviour,* 1949, pp. 109-120.

H.M.S.O. *The Place of Welsh and English in the Schools of Wales.* Report of the Central Advisory Council for Education, Wales, 1953.

H.M.S.O. *The Future of Secondary Education in Wales.* 1949.

H.M.S.O. *Bilingualism in the Schools of Wales:* Y Broblem Ddwyieithog yn yr Ysgol Uwchradd yng Nghymru: Welsh Department, Ministry of Ed. Pamphlet, No. 4.

H.M.S.O. *The Future of Secondary Schools in Wales.* Report of the General Advisory Council (Wales), 1949.

James, C. " Bilingualism and Non-Verbal Reasoning." *Bulletin No.* 5, Univ. Coll. Fac. of Ed., Aberystwyth, 1958.

James, C. " A Comparative Study of General Performance between Bilingual and Monoglot Children in South Wales." Unpublished B.Ed. Thesis, Univ. of Edinburgh, 1947.

Jones, I. *A Review of Problems of Research into Bilingualism and Allied Topics.* Pamphlet No. 1, Univ. Coll. Fac. of Ed., Aberystwyth, 1953.

Jones, W. R. " The Language Handicap of Welsh-Speaking Children: A study of their performance." *Brit. Journ. Ed. Psych.*, Vol. XXII, Part II, June 1952.

Jones, W. R. *Bilingualism and Intelligence.* University of Wales Press, 1959.

Jones, W. R., Morrison, J., Rogers, J., and Saer, H. *The Educational Attainment of Bilingual Children in relation to their Intelligence and Linguistic Background.* Univ. of Wales Press, 1957.

Leopold, W. F. *Speech Development of a Bilingual Child: a linguistic record.* Chicago, 1939.

Liebenburg, D. J. "Report on Bilingual Administration"—The Public Dept. of Ed., Cape Town. *Bulletin No.* 4, Coll. Fac. of Ed., Aberystwyth.

Morrison, J. R. " Bilingualism: some Psychological Aspects." Paper read to the *Brit. Assoc. for Advancement of Science,* No. 56, March 1958.

O'Doherty, E. F. " Bilingualism: Educational Aspects." Paper read to the *British Assoc. for the Advancement of Science,* No. 56, March 1958.

O'Domhnallain, T. " Bilingualism in Ireland." *Bulletin No.* 6, Coll. Fac. of Ed., Aberystwyth.

Penfield, W. Address to the American Academy of Arts and Science in February, 1953.

Penfield, W. *The Excitable Cortex in Conscious Man.* Sherrington Lectures, Liverpool Univ. Press, 1958.

Piaget, J. " Perception et Intelligence." *Bulletin* du Groupes d'Etudes de Psychologie de l'Université de Paris, 1950.

Pinsent, A. *The Construction and Use of Standardised Tests of Intelligence and Attainment.* Pamphlet No. 3, Univ. Coll. Wales Fac. of Ed., 1954.

Rees, G. *A Welsh Linguistic Background Scale.* Pamphlet No. 2, Univ. Coll. Wales Fac. of Ed. Aberstwyth.

Saer, D. J. " Psychological Problems of Bilingualism." An address written for the International Conference of Bilingualism at Luxemburg, organised by the Bureau International d'Education, and published in *The Welsh Outlook,* Vol. XV, Nos. 5 and 6, 1928.

Saer, H. and Smelten, N. " Bilingual Education in Belgium." *Bulletin No.* 5, Coll. Fac. of Ed., Aberystwyth.

Simmons, E., Williams, U., Morgan, G. A. V., and Peaker, G. F. *Report of the North Wales Child Guidance Clinics for the year ending 31st December,* 1957.

Thomas, B. B. " An Administrator's Approach to the Implementation of Bilingual Policy." Paper delivered to the *Brit. Assoc. for the Adv. of Science,* 9th September, 1957.

Thompson, G. H. "Instinct, Intelligence and Character," pub. Allen & Unwin, 1949

Thomas, J. *Third Language Survey of Caernarvonshire Schools.* Gilym Evans, Caernarvon, 1952.

Williams, J. L. " Y Ddwy Iaith Yn Yr Ysgol," Argraffwyd o'r Faner. *Hydref* 24, 1957.

Williams, J. L. " The National Language in the Social Pattern of Wales." From Dec. *Studies,* Autumn, 1958.

" The Bilingual Game." *The Welsh Anvil,* 1958.

Yates, A. and Pidgeon, D. A. *Admission to Grammar Schools.* Third Interim Report on the allocation of Primary School-leavers to Courses of Secondary Education. Published for the National Foundation for Educational Research by Newnes Ed. Pub. Co., 1958.

Research Note:

IMPROVING TEST VALIDITY BY COACHING

by Gina R. Ortar

(School of Education, The Hebrew University, Jerusalem)

Introductory Remarks—Alfred Yates

The following article has been contributed by a distinguished educational psychologist from the Hebrew University, Jerusalem, who has been visiting this country for the past few months and has spent a considerable portion of her stay working at the Foundation.

Dr. Ortar's proposals for the construction and development of tests which incorporate a period of coaching and which attempt to assess the child's capacity to profit from instruction are worth examining closely. There must be many situations in which a reliable assessment of a person's ability to absorb new knowledge or to acquire fresh cognitive skills would be as useful or possibly even more useful than evaluation of his previously acquired abilities and attainments which must obviously depend, to some extent, on the kind of experience he has enjoyed and on the quality of the instruction he has received. The kind of test which Dr. Ortar describes could have many useful applications both in educational and in vocational guidance.

In the circumstances in which Dr. Ortar's test has been used, it was clearly necessary to depart from normal testing practices, since she was confronted with children from many different countries with markedly different social and cultural backgrounds. Although no-one would deny that there are differences of this kind to be found within a random sample of children in our own country, they are, of course, relatively insignificant compared with the kind of variation with which Dr. Ortar was dealing. It is possible, therefore, that the results she obtained would not be duplicated if a similar experiment were tried here.

During the course of her article she draws a comparison which may well be misleading to readers in this country. She demonstrates that, in her experiment, the scores obtained by children after they had been coached corresponded more closely with teachers' assessments of their pupils' abilities than did the children's initial scores. She then discusses the kind of coaching and practice that often precede the eleven-plus examination in this country and may perhaps convey the impression to some that such coaching should be encouraged as a means of improving the validity of our procedures for selecting pupils for grammar schools. The situation of her own work as she describes it is, of course, totally different from that which confronts a local education authority in this country. She is concerned with the problem of assessing the abilities of children who speak different languages and who have been brought up in a variety of cultures. Those local authorities in this country which approve or promote a certain amount of coaching for, or practice in, objective tests prior to the eleven-plus examination are not seeking to enable educationally deprived children to compete on equal terms with those who have enjoyed vastly superior schooling. They are merely endeavouring to ensure that all children are acquainted with the particular form of examination that has been devised for them. The vast majority of children concerned have had sufficient educational opportunities to enable them to reveal their " true " ability in tests of the conventional type.

This caveat is not intended to detract in any way from the value and importance of Dr. Ortar's research. If the kind of test she outlines can be satisfactorily developed it may well serve a number of useful purposes.

THE level of attainment of a group or an individual can be measured by a variety of more or less objective techniques. The best-known among them being school marks and standardised attainment tests. These methods of evaluating the present level of attainment are frequently used also for predicting future achievement and for this purpose various types of intelligence tests are usually added.

Although these tests are considerably correlated among themselves, and therefore to some extent measure the same abilities and attainments, each of them measures also some additional factors and its predictive or diagnostic power depends on the extent to which these factors are related to the criterion.

When the criterion is future success in school, an improvement in validity of objective tests is best achieved by adding suitably weighted school marks, or scaled teachers' estimates. It is generally supposed that such measures of school attainment reflect to a considerable degree certain personality variables which may have accounted for failure or success in school in the past and will do so again in the future. Owing to these factors the actual achievement in school is, in the case of some children, different from the level that would be expected on the evidence of objective tests alone.

Most of the existing objective tests are composed of items which sample a child's behaviour at the precise moment of testing. The score on these tests is the outcome of the subject's total experience which in turn is a result of interaction between his inborn (but unmeasurable) intelligence, his general environment and his special knowledge in the subject-matter tapped by the test, and last but not least, his " test-sophistication."

If it could be assumed that all but the inborn factors were equal for all subjects, the test scores obtained could be considered as representing the subject's " true " ability. This measure could probably be used at the same time for prediction and " postdiction," its use in prediction depending, of course, on the assumption that the children's environment and training will remain equal.

Such an assumption of past equality in experience is rarely, if ever, justified and, in consequence, the measures are less valid than they would be, if at least a better approximation to equality could be achieved. Many research workers, working with subjects whose previous experiences were obviously different from those for whom the test was designed, have tried to lessen the weight of this factor by letting the subjects repeat the test several times, with or without help and explanations. (*See references* 1, 2, 3, 6, 7 *on Page* 142.) This technique was applied when there were clear differences in cultural patterns (3, 6), social class (1) and intelligence (2, 7). In all instances, as a consequence of simple re-test, a practice period, coaching or added incentive, the final scores tended to be higher than the initial scores and to be correlated more highly with the criterion (8).

Such general improvement is probably due to a number of factors. The more obvious of these are:

(1) better understanding of the principles underlying the test. Reasoning based on general principles is often alien to some of the subjects either because it had not been demanded of them at all (cultural pattern), or because it was not absorbed when taught (social class influence);

(2) discovery of errors in reasoning committed on particular items;

(3) more positive approach to the familiar task.

The ways of adding incentive, coaching, training or repeating the test have not yet in themselves served as subjects of research; the meaning of these terms as used in the literature is ambiguous and they are sometimes used interchangeably. Consequently, not much is known about the best way to impart to the testee the necessary experience. It is quite probable that this process will prove not to be amenable to standardisation, being dependent on the subject's degree of previous acquaintance with the task.

Differences in the amount and kind of training given by the investigators and different methods of treating the data have resulted in conclusions which cannot be easily compared. It seems, however, that generally the verbal tests have been least susceptible to all kinds of training, but the scores even on these tend to increase with practice or coaching. In the few instances when the correlation of initial and final scores with an outside criterion (teachers' judgment or school record) was computed, it was found that, on the whole, the final scores had higher validity coefficients. To this end some optimal amount of practice seems to be essential; too much of it probably tends to increase the influence of purely formal factors or of boredom and so to reduce the validity as compared to the first testing (5).

Thus, there seems to exist a justification, on theoretical as well as on practical grounds, for a technique which is directly aimed at equalising the experience of all the subjects who are to be tested and assessed. It is now accepted that valid results cannot be achieved by devising a task which is equally unfamiliar to all the testees. The condition of equality must, therefore, be achieved by attempting to make the principles of a given task equally well perceived and understood by everybody taking the test. The necessary supplementary experience must be provided in a way that takes into account the subject's present level of reasoning ability and which develops it in the direction needed for the given problem. This can hardly be done by means of simple repetition; a period of explanation, trial on the subject's part and possibly even individual instruction should be introduced. The resulting behaviour may be thought of as reflecting the subject's ability to profit from instruction (past or recent), it may then be measured and the test validated by comparison with some external criterion of learned behaviour.

The measure of this ability, e.g. the final score, should remain wholly independent of any gain made during the instruction period as this would reintroduce the influence of unequal previous experience. This differentiation between the past and the recent experience would as a matter of fact be immaterial in most life-situations. A teacher in school, an instructor in handicrafts, or an employer want most of all to be told how much a subject is able to learn when given a fair amount of instruction. They are often aware that the amount of teaching needed by different subjects varies, within certain practical limits, but this factor tends, on the whole, to be disregarded after the completion of training, when the final success is assessed. The proposed way of testing is, therefore, a technique midway between the usual type of test and a trial period which is often impracticable and sometimes clearly impossible.

The experiment in measuring " educability " stems from various, mostly unsuccessful, attempts on the part of the writer and her co-workers to assess the " learning potential " of new immigrants to Israel in the early 'fifties. The subjects, mostly children of primary school age, came from oriental countries and many of them had never been to school. No attainment test seemed, therefore, to do them justice and as a rule, the adapted Wechsler Intelligence Scale for Children (WISC) was used. After a time, it became obvious, that contrary to the expectations, the verbal part of the WISC, despite its difficulty, was a much more valid predictor of the children's progress in school than the performance part, which, moreover, was comparatively even more difficult. Discussions with the subjects and the testers led the writer to the belief that the failure of the performance part of the test to distinguish between the more or less able children was due chiefly to their insufficient understanding of the essential principles underlying the test. The meagre success was as often as not achieved through relying on some external clues, irrelevant to the general problem posed in the test. It was then decided to try and set up a new device that could predict the learning potential of children who had been brought up in different cultures. All the existing " international " or " inter-cultural " scales seemed to depend on the subject's ability to " educe " for himself right from the start the general principle involved —an ability which is surely not identical with whatever is needed for successful learning in school or learning a trade. In these situations the principle or the " laws " are, for the most part, explained and all an average child is required to do is to follow them. The instances in which he is compelled to seek new ways of dealing with a problem are rare indeed, if the so-called " creative " parts of a task are excepted.

This reasoning seemed to apply to everybody and not only to the immigrant child, and consequently a task was sought which should be relatively unfamiliar to most and at the same time suitable for instruction and explanation " on the spot." All verbal and most of the numerical tests seemed inappropriate since a child's ability to deal with tests of this kind depends largely on the kind of background he has enjoyed and the amount of instruction he has received. Conversely, as failure on the WISC (and other performance tests) indicated, a performance task seemed to answer the requirements. We assumed it to be scarcely familiar to the children both as a material and as a medium for abstract thought and therefore suited as a measure of their ability to apply learned principles of behaviour. The task finally chosen was that of constructing a pattern out of superimposed " stencils." It is somewhat similar to the " Stencil Test " of G. Arthur, although the form of the stencils and the manner of administration are very different.

The test consists of three parts. The first one is given and scored like any other test. The scores may be later compared with the final success, although they are not in any way used for computing the gain or the final score. It is conceivable however, that the comparison between the initial and the final scores may be useful as a measure of cultural or social-class differences. It may also prove fruitful as a clinical instrument.

In the second part of the test a considerable number of specially chosen and graded items is administered. The subject has the opportunity to try and solve them on his own but if he fails (through producing a false solution, abandoning the task or getting " stuck ") the examiner explains to him the principles involved, using, as far as possible, the subject's own method of approach and a suitable degree of abstraction. The failed items of the first part are also discussed in order to establish a maximum similarity of experience previous to the administration of the final part. (The practice is to be interrupted if a certain number of graded items is failed, e.g. if it is obvious that the subject will not profit from further explanations.)

The third part of the test is again administered in the usual manner, apart from the fact that the coaching period makes any examples superfluous. The items of this part are new and towards the end much more difficult than in the coaching period, but no entirely new approach or principle is involved.

The test was standardised on a small but probably representative sample of Israeli children (N = 397) aged from 6 to 14 and the norms were extended by extrapolation for 11 months at each end. Subsequently, it was given in some other schools and the table summarising the validities is given below. The scores were computed in deviation I.Q.'s and correlated with the teacher's judgment on the academic as well as on the practical (handwork) subjects.†

TABLE I

Correlation between teachers' marks and scores on the first and the final parts of the Triangles Test

TEACHERS' MARKS

TRIANGLES TEST	*Academic subjects*				*Practical subjects*	
	Schools				Schools	
	A N=62	B N=57	C N=100	D N=87	A N=31	B N=56
First part . .	.246	.276		.234	.273	.09
Final part . .	.535	.335	.524	.402	.470	.198

The substantial increase in validity which follows the period of instruction is seen clearly from the table.

The Triangle Test in its present form and according to its norms is probably valid only for Israel, but the general principle of a test in which a coaching period precedes the actual measure of success can be profitably adapted for individual or even group testing, especially when subjects with different social or cultural backgrounds are to be tested and their probable success in a given line of education is to be assessed.

As long ago as 1935, Otto Selz published a paper on " Experiments for Improving the Level of Intelligence " in which he advocated the use of various tests, verbal and non-verbal, as means of improving the pupils' ways of dealing with abstract problems.

---

†Reliability of the final part (split half r, uncorrected for length, age held constant) was $r = .924$.
Correlation with Wechsler Children Scale (Verbal part) resulted in :
$r = .408$ (first part, before coaching)
$r = .487$ (final score, after coaching).

On the evidence of experiments conducted by his students he claims that this instruction in solving problems really raised the level of intelligence in some classes of slow learning children. In the light of our present knowledge, it is hard to share Selz's optimism, but his technique of explanations and exercises in class preceding the final test could be tried out for the development of a group test measuring learning potential.

More recently many British research workers have been concerned with the "coachability" of different kinds of tests. Whenever the validity was considered and computed, their results clearly indicate its increase after optimal coaching. If no testing (and especially in regard to the 11-plus) were to be done except after a suitable coaching period, some of the shortcomings accepted as inevitable (and connected in the main with coaching and social-class differences) might perhaps be avoided and both the reliability and the validity increased.

The main drawback of coached testing would be the increased duration of the testing period. This, however, need not be excessive. Another difficulty, if attempts were made to employ this technique on a large scale, would be the need for a large body of carefully trained people to administer the tests and to provide the necessary coaching effectively.

According to the results of research, verbal tests are less susceptible to coaching than non-verbal or performance ones, probably because the school has already provided the necessary training in many of the language skills.* The most suitable medium (whether words, pictures, abstract drawings, symbols, models or real objects) to be used will depend on the purpose of the test and the general conditions to be fulfilled. It will probably have to be decided empirically with reference to the criterion used for estimating the validity.

Bibliography

1. HAGGARD, E. A. "Social Status and Intelligence, an experimental study of certain cultural determinants of measured intelligence." *Gent. Psych. Monog.*, 49, 1954.
2. HEIM, A. "The effects of repeatedly retesting the same group on the same intelligence test." *Quart. of Exp. Psych.*, 1, 1949; 2, 1950.
3. JAHODA, G. "Assessment of abstract behaviour in a non-western culture." *J. of Abn. and Soc. Psych.*, 1954.
4. MORGAN, G. A. V. *A Study of Verbal Abilities.* Unpublished Ph.D. Thesis, University of London, 1953.
5. NAVATHE, D. V. *The Influence of the Form of Items on Intelligence Test Scores and its susceptibility to practice.*" Unpubl. Ph.D. Thesis, University of London, 1953.
6. OMBREDANE, A. "Principe pour une étude psychologique des noirs du Congo Belge." *Anné Psychologique*, 1951.
7. SELZ, O. "Versuche zur Hebung des Intelligenzniveaus." *Zeitschr. fuer Psych.*, 134, 1935.
8. WOODROW, E. "Factors in improvement with practice." *J. of Psych.*, 7, 1939.

---

*This might be part of the explanation of the seemingly strange fact that verbal tests are more valid predictors than non-verbal ones for many training courses and occupations of a practical kind.

Research Note:

SELECTION FOR SECONDARY TECHNICAL COURSES – A REPORT OF A PILOT INVESTIGATION

ALFRED YATES and FRANK BARR

A CONSIDERABLE amount of research has been devoted to the problems involved in allocating primary school-leavers to suitable courses of secondary education. The vast bulk of it, however, has been concentrated on the selection of pupils for grammar schools and relatively few schemes of selection for secondary technical schools have been reported.

For example, one type of selection procedure has been proposed which involves the administration of a battery of tests to all candidates applying for entrance to grammar and technical schools. For each candidate two lists of scores are compiled giving respectively a grammar and technical school aggregate. The two aggregate scores are then plotted on a graph—the data, of course, being expressed in similar units, for example I.Q.'s with a mean of 100 and a standard deviation of 15 points. On each axis of the graph two marks are made, the upper one cutting off candidates who are clearly acceptable, the lower indicating those who definitely cannot be offered places, with the area between forming a border-zone of doubtful cases. The level of the marks is determined by the number of places which are available in each type of school.

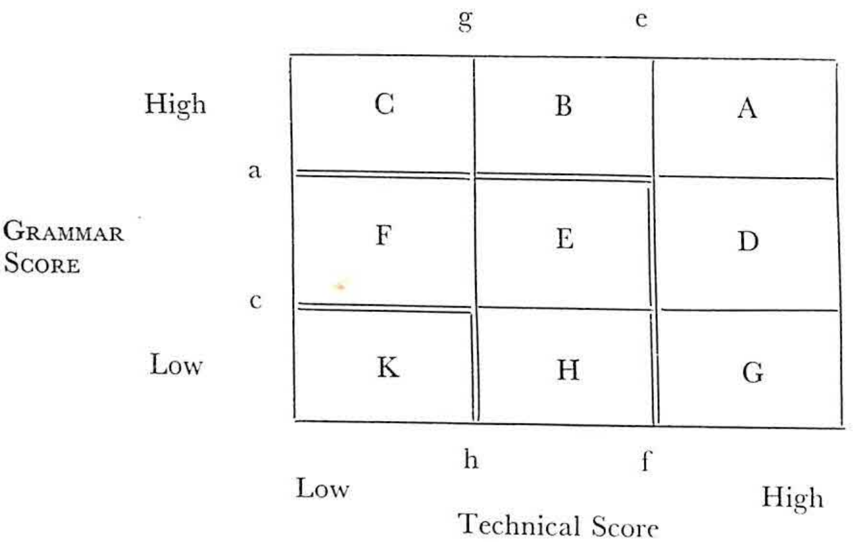
The scores used in this way by Lambert and Peel were derived from Moray House tests of general ability, attainment in English and Arithmetic, "practical" performance and "paper and pencil" tests, and their own General Information test which yields "practical" and "academic" scores. A suggestion made by Alexander was also incorporated into the procedure. This involved plotting not the total scores but the difference between practical and verbal ability aggregate scores. Where a difference of 10 or more points occurs candidates are offered places in the appropriate course, with the reservation that technical school entrants must achieve a minimum score of 100 points on the verbal ability tests.

A similar method was adopted by Wiseman and Fitzpatrick. Scores of general ability, English and Arithmetic formed the core of both the grammar and technical school test arrays, the former being completed by an English Essay and the "academic" score of the investigators' *Devon Interest Test*, and the latter by the interest test's "practical" score and a spatial test. The two aggregate scores for each candidate were graphed; parents' preferences and teachers' recommendations were also recorded.

DIAGRAM

METHOD OF PLOTTING " GRAMMAR " AND " TECHNICAL " SCORE

(*Source—Manual to Devon Interest Test*)



Note:
Area a, f, h, c
is the border-zone

The situation is represented by the diagram. Children who have high technical and grammar school scores (A) are offered the choice of taking a place in either school. However, high technical school scorers who have medium (D) or low grammar school totals (G) are offered only a technical school place; if this is refused then those with (D) for grammar school are transferred to a border-zone grammar school group (F), whilst those with (G) are not considered any more for either school and are placed at (K). Similarly, high grammar school scorers with medium (B) or low (C) technical school totals are offered grammar school places a refusal of which involves either transfer to border-zone technical school candidates (H), or forfeiture of further consideration for a place (K). Border-zone candidates are then admitted according to the number of school places which remain.

Unfortunately, little use has been made of these schemes and available evidence about their effectiveness for selection for technical courses is slight. The pilot investigation reported in this note was designed to yield some useful information, mainly about the predictive value of various tests. It was carried out with the co-operation of the Wallasey Education Authority.

Some of the tests used were employed by the Authority as part of its procedure for allocating children at the age of eleven either to grammar schools or to the two secondary technical schools in the Borough (one for girls, and one for boys). The other tests were administered by the Foundation specifically for the purposes of the inquiry.

The sample

The children concerned in this investigation were the boys and girls who entered the Authority's secondary technical schools in September, 1954. It is, of course, rarely possible to preserve a sample intact throughout the course of a follow-up study and the results discussed in this report are related to 94 of these children (42 boys and 52 girls) whose progress has been followed up to the end of the fourth year of their course, and for whom it has been possible to collect a full array of test scores.

The tests

The following tests were administered by the Authority before the children left their primary schools:

Moray House Verbal Reasoning
Moray House English
Moray House Arithmetic

At the outset of their secondary technical school course the children in the sample were set the following additional tests:

N.F.E.R. Non-Verbal Test 3
N.F.E.R. Spatial Test II
Watts' Group Performance Test
N.F.E.R. Clerical Test I
The Lambert-Peel General Information Test
The Devon Interest Test

The Devon Interest test has separate versions for boys and girls whilst the Lambert-Peel General Information test is designed for boys only.

This battery of tests was designed to obtain measures of skills that may well be relevant in secondary technical courses, but which are not assessed by means of the conventional tests of verbal reasoning, English, and arithmetic. The non-verbal and spatial tests attempt to measure perceptual skills and powers of inductive and deductive reasoning applied to shapes, designs and patterns. The General Information and Interest tests provide an indication of the bias of children's interests towards either academic or more practical pursuits.

The General Information test and the Devon Interest test were repeated in 1956 during the first term of the third year of the secondary school course.

The Criterion

The Heads and staffs of the two secondary technical schools were asked to keep records of the children's progress and, at the end of the fourth year of the course, to arrange them in rank order on the basis of their suitability for the courses which the schools provide. This order was based, in the main, in the cumulative results derived from the school's examinations, but since, after the second year in the boys' school and after the third year in the girls' school, alternative courses are provided, the Heads were required to carry out the difficult task of assessing and comparing the progress of children who had pursued different curricula.

The curricula and courses available

(a) Boys

For the first two years the boys followed a general course comprising English, History, Physics, Chemistry, Technical Drawing, Mathematics, Art, Spanish, Religious Instruction and Music. Rather more time is devoted to Physics, Chemistry and Mathematics than in the average grammar school course at this stage and these subjects are taught with a practical, rather than a theoretical bias.

At the beginning of the third year the boys are allocated either to a course leading to the General Certificate of Education at Ordinary level with a slight bias towards Engineering, or a General Certificate of Education course with a slight bias towards Architecture. The bias is slight in that all the boys continue with the general subjects listed above, the Engineers taking, in addition, three periods of Geography, two periods of Engineering and two periods of Metal Work, and the Architects take three periods of Surveying, two periods of Woodwork and two periods of Building Construction.

(b) Girls

For the first three years the girls follow a general course which is similar to that taken in any grammar school. The course includes one Foreign Language, two Sciences, Art, Cookery and Needlework.

In the fourth and fifth years the girls are allocated either to a commercial course or a practical course.

The commercial course comprises English Literature, English Language, Economic and Public Affairs, Geography, French, Mathematics, Commerce, Principles of Accounts, Shorthand, Typewriting and one practical subject (Art, Needlework or Cookery).

The practical course involves English Language, English Literature, French, Biology, Chemistry, Mathematics, History, Geography and two practical subjects (Art, Needlework or Cookery).

Within each course there are two grades or streams, the girls in the higher grade offering five or more subjects in the G.C.E. " O " level examination, those in the lower grade offering fewer subjects at this level and others for the Royal Society of Arts examinations.

Analysis of the results

The predictive value of the tests

The results for the boys and girls were analysed separately.

Boys

A comparison between the results of the tests administered in 1954 and the order of merit provided four years later by the teachers showed that the best prediction was offered by the N.F.E.R. Spatial Test II ($r = 0.4122$). The practical score on the Lambert-Peel General Information test also correlated significantly with the criterion ($r = 0.3044$); but neither this nor any of the other tests, when added to N.F.E.R. Spatial Test II, increased the level of prediction provided by the latter.

Girls

The analysis of the girls' test results revealed only one significant correlation with the criterion—that of the Moray House Arithmetic Test ($r = 0.2774$).

The prediction afforded by this test was not increased significantly by the addition of any of the other tests.

The interest tests

The Lambert-Peel General Information Test and the Devon Interest Test were administered twice, in 1954 and again in 1956. The purpose of this repetition was to examine the extent to which the bias of the children's interests was affected by their experience of a secondary technical school.

The analysis of the results showed that in almost every respect the boys' scores differed from those of the girls. In the practical section of each test the boys' average score was higher than that of the girls. There was an even more striking difference between the sexes when the 1954 and 1956 results were compared. The girls' scores in the practical section of the tests—their bias, that is, towards practical or technical interests—did not change significantly. The boys' scores, on the other hand, showed a marked increase.

Discussion of the results and conclusions

The predictive value of the tests

The sample of children studied was very small and this investigation can only, therefore, be regarded as a pilot study yielding suggestive rather than conclusive results. Two of the findings, however, since they serve to confirm the results of other similar inquiries, are deserving of comment.

It is first of all clear that the conventional battery of tests—Verbal Reasoning, English and Arithmetic—can bear a considerable part of the burden of predicting success in secondary technical courses. The worth of these tests as predictors of success in grammar schools has been amply proved. It is clear that there is a sufficient correspondence between the abilities and qualities required for success in the two types of course for this battery to be affective also for selecting candidates for secondary technical schools. Indeed, the results of this inquiry suggest that the Authority's present procedure of relying on evidence yielded by these tests, together with the assessments provided by primary school teachers and the preferences expressed by the children's parents is a satisfactory one. There is no evidence from the results obtained from this investigation to suggest that any of the additional tests administered for experimental purposes could add to the predictive value of the Authority's present procedure as far as the girls are concerned.

The results indicate, however, that for the boys the inclusion of a test of spatial ability adds to the predictive value of the battery. It has been found previously*, of course, that such a test helps also to predict success in a grammar school course. No doubt, the skills that are measured by this test are brought into play in subjects such as the

---

**Admission to Grammar Schools.* Yates and Pidgeon. Newnes Educational Publishing Co., London, 1958.

natural sciences and some branches of mathematics—which are common to grammar and technical schools—and in technical drawing. The emphasis placed in the boys' secondary technical school on science and mathematics and, particularly, the fact that these subjects are taught with a practical bias, together with the inclusion of technical drawing in the syllabus probably explain why, in the results obtained from this inquiry, the spatial test was found to be a useful predictor for boys but not for girls.

The interest tests

The most striking result of the comparison between the results of the interest tests in 1954 and 1956 is the increase in the boys' practical scores. This suggests that the secondary school course they have followed has markedly affected the bias of their interests. It would be interesting to repeat this inquiry in a grammar school to test the reasonable hypothesis that experience of an academic course might similarly increase the scores in the academic sections of the test.

The girls did not manifest a similar increase. The reason for this difference may well be due to the differences in the curricula of the two schools. For three years the girls follow a course which is described as " similar to that taken in a grammar school." The undifferentiated course is one year shorter for the boys and comprises, from the outset, an emphasis on the practical aspects of science and mathematics and these subjects have as a result, a marked vocational " bite."

It would be fair, therefore, to describe the boys' course as more specifically " technical " than that provided for the girls—in the early stages at least—and this distinction probably accounts for the difference in the result of the interest tests.

Bibliography

ALEXANDER, W. P. " Selection of pupils for different types of Secondary Schools." *B. J. Ed. P.*, 1947, 17, pp. 123-30.

BRADFORD, E. J. G. " Selection for Technical Education," Part I. *B. J. Ed. P.*, 1946, 16, pp. 20-31.

BRADFORD, E. J. G. " Selection for Technical Education," Part II. *B. J. Ed. P.*, 1946, 16, pp. 69-81.

LAMBERT, C. M. " A Survey of Ability and Interest at the stage of transfer." *B. J. Ed. P.*, 1949, 19, pp. 67-81.

PEEL, E. A. " Assessment of Interest in Practical Topics." *B. J. Ed. P.*, 1948, 18, pp. 41-47.

PEEL, E. A. " Symposium on the selection of pupils for different types of schools, VI. Evidence of a Practical Factor at the age of 11." *B. J. Ed. P.*, 1949, 19, pp. 1-15.

WIEGERSMA, S. and BARR, F. " Educational Guidance—II: Interesting Testing in Educational and Vocational Guidance." *Educational Research*, 1959, Vol. II, No. 1, pp. 39-64.

WISEMAN, S. and FITZPATRICK, T. F. " An interest test for use in selection for technical education." *B. J. Ed. P.*, 1954, 24, pp. 99-105.

WISEMAN, S. and FITZPATRICK, T. F. *Manual of the Devon Interest Test.* London: Oliver & Boyd, 1954.

Abstract:

"AN EXAMINATION OF SOME PSYCHOLOGICAL EFFECTS OF TEACHING ENGLISH IN SCHOOLS"

Summary of M.A. Thesis submitted for approval, December, 1959,
University of London

MURIEL M. KAY

Statement of problem

THE operational research described in this thesis was undertaken in order to explore some of the psychological implications of the English lesson, with particular relevance to the fostering of personal development and the growth of human relations. It was based on the following premises: (*a*) that work in English is primarily and essentially concerned with language; (*b*) that language is intimately related to the psychological processes of interaction, communication, and the development of the Self; (*c*) that communication in language occurs through the media of speaking, reading, writing and listening; these being fundamental activities in all English lessons; and (*d*) that, within the teaching situation, the quality and nature of the personal relationship established between teacher and taught will have an important bearing on the quality and nature of the resultant communication taking place between the persons in the group.

Sample

The work was undertaken with 73 adolescent grammar school girls, whose chronological ages ranged from 15.0 to 18.6. The majority of these consisted of the members of the three Fifth Forms in the school; there was, in addition, a small group of Sixth Form girls. All were following the normal course of study towards the G.C.E. examination, at "O" or "A" level, in English Language and English Literature. The investigator herself performed a dual function: that of teacher and that of research-worker.

Method

It was decided at the outset of the project that, owing to the special educational needs of the girls concerned, as well as the environmental circumstances in which the work took place, no modifications of normal teaching procedure could or should be made; and that the research material should be obtained through the two channels of: (*a*) the written, and (*b*) the spoken, word.

The first year of the enterprise was occupied largely with the work as a full-time practising teacher; during the course of this, there also proceeded the collection of relevant research material. The work was, perforce, undertaken within the limits set by the University examination syllabus; nevertheless, where choice of texts was possible, the selection was made on the grounds of the girls' known abilities, needs, and interests. In the teaching approach, emphasis was placed less on literary criticism and detailed study of style and technique; and much more on the elucidation of meaning, on a study of character and motive, on the provision of opportunities for understanding the emotional significance of the work studied, for expression of the girls' subjective responses, and for further explorations of the writer's theme. Similarly, in the written work undertaken by the girls, the choice of essay-subjects was influenced largely by their own voiced wishes, preferences, and observed lines of development. The chief overall aim throughout the year's teaching was to enable the girls, through their speaking, reading, writing and listening activities, to clarify, strengthen, and enrich their own experience, as well as to broaden and deepen their relations with others.

By the close of this first year, two kinds of material had been collected: (*a*) the *spoken* contributions of the small Sixth Form group, in 101 meetings from October to June, had been recorded; (*b*) *written* contributions had been obtained from all 73 girls, in the form of five essays on the subjects of: Myself; People; The Person I would most like to be, and the Person I would most like to meet; Two Character Sketches; Three Wishes.

Analysis of data

This material was subsequently treated thus. Analyses were made of: (*a*) *the social interaction* in the Sixth Form group, using techniques similar to those described by Robert Bales in "Interaction Process Analysis"; (*b*) *the subject-matter of discussion* within this group; (*c*) *the content of the essay material*. These analyses ultimately produced evidence which was, on the one hand, *quantitative:* here, a series of charts and tables was constructed through the analysis of social interaction and of essay material; and, on the other hand, *topical:* here, information was obtained, from spoken and written contributions, regarding the meaningful areas of experience for the total group, as well as individual differences of response thereto. With particular regard to the essay material, this was finally found to be summarisable under the following heads: (*a*) The adolescent and physical characteristics; (*b*) The adolescent and social relationships; (*c*) The adolescent and school; (*d*) The adolescent and vocational concerns; (*e*) Adolescent leisure-interests; (*f*) Adolescent wishes; (*g*) The adolescent and the search for values; (*h*) The adolescent and personality development.

Results

On the basis of the total evidence thus compiled, the following psychological effects of English teaching were adjudged to have resulted.

A. DEVELOPMENTAL

1. *A clarification and enhancement of the self-picture.* Through their participation in the language activities of speaking and writing, these girls had been enabled to embark on a graduated process of self-discovery, self-knowledge and self-acceptance.

2. *A stimulus towards personal growth*, in the progressive achievement of developmental tasks.
3. *Improvement in social relations*, both between teacher and taught, and within the peer-groups. Evidence from the interaction analysis showed: (*a*) an increase in the amount of interaction; (*b*) a growth in group solidarity; (*c*) a decline in the expression of negative feeling. Moreover, the essay material provided evidence of a high degree of sincerity, freedom and spontaneity, which was considered a further indication of productive social relationships.

B. THERAPEUTIC

1. *Reduction in anxiety and tension.* This was most clearly documented in the interaction analysis; analysis of subject-matter also revealed the taking of opportunities for the expression of fears, aggressions and antagonisms.
2. *The opening of new channels of communication between adult and adolescent.* Spoken and written records showed that two-way communication progressively improved, in quantity and quality.
3. *The exploration of personal problems* in a group situation was considered somewhat analogous to work done in group psychotherapy.
4. *Opportunities for emotional release*, through contact with literature, and through personal writing. Both positive and negative emotions were expressed; at an affective and at a cognitive level.

Finally, the project was considered to be additionally contributory to: (*a*) a further understanding of adolescents; (*b*) a more insightful treatment of individuals; (*c*) the mental health and growth of the teacher.

Thesis Abstract:

AN ENQUIRY INTO FACTORS ACCOMPANYING SECONDARY SCHOOL PUPILS' INTEREST IN SCIENCE

Summary of a Thesis presented for the degree of Doctor of Philosophy in the University of London, June, 1959

GEORGE R. MEYER

(i) Introduction

The motive of the enquiry was the belief that one of the primary aims of general education is the developlent of genuine interest in science among all citizens; and that clearer understanding of the concomitants of science interest could assist in that development.

The study was concerned with a description of the significance and strength of the relationships between science interest and factors considered by educationalists and psychologists to be causally related to it.

(ii) Methods

The subjects were a group of 150 secondary pupils aged from twelve to fifteen years in a mixed bilateral (technical and modern) school near London. The pupils were intensively tested, interviewed and observed over a period of ten weeks.

Three aspects of science interest were measured by interest inventories scored by absolute summated rating. These aspects were : interest in scientifically biased leisure activities; interest in the scientific method; and interest in topics most frequently occurring in school general science courses. Each test was found to be reliable and valid and the three were combined into a single battery which was used to obtain a science interest score for each of the 150 pupils in the study. Validation of the battery was obtained by correlating its scores with those from related tests[1], by checking its ability to discriminate between groups with known characteristics[2], by correlating it with essay and interview data and with graphic ratings by self, friend and teacher.

Instruments were developed to measure the fifty variables, suspected by a panel of psychologists and educationalists to be related to science interest. These instruments included ranking and rating scales, opinion polls, attitude tests, interest inventories, essays, interviews, sociometric tests and observational techniques. All were found to be reliable and sufficiently valid for the purposes of the enquiry. Most data were collected by group tests but some were from the study of three individual cases.

---

[1] Related tests included those developed to estimate interest in and attitude towards science in general and as a school subject.

[2] These included pupil groups with science and non-science vocational bias, and with science and non-science school subject preference.

(iii) Results

A number of sociological and educational factors was found to be related to science interest.

There was a considerable sex difference, boys being much more in favour of science than girls. There appeared to be a slight but significant decline in interest with age as the pupils approached the statutory school leaving age but as the sample was perhaps biased towards pupils who would be likely to leave school early, any generalization on this finding would be unwarranted. The science interest scores of pupils who wanted to leave school at either fifteen or sixteen years of age were significantly lower than those who wanted to leave at seventeen or eighteen, and there was a low but significant correlation between science interest and attitude to school. Yet there were no significant links between science interest and intelligence, ability in English and Arithmetic or attainment in the school science examination.

There was a significant correlation of moderate strength between interest and the degree of sophistication of a pupil's definition of science; and interest in various branches of science were found to be related to total science interest in the following rank order by strength of relationship—Physics, Geology, Chemistry, Astronomy, History of Science and Biology. Of the various methods available to a pupil for solving school science problems, interest in scientific method was most closely linked to total science interest followed by interest in consulting experts, in reading books, and finally, in asking teachers for the solution.

Studies of the relationship between total science interest and interest in various types of school subjects showed some contrasted trends. Interests in science type subjects were, of course, closely linked to total science interest, as were interests in mathematical subjects. It was perhaps unexpected though to find a moderately significant link between interest in science and English/History type subjects and yet an absence of a significant link with Practical/Craft subjects. Music/Art and Foreign Language subjects had no significant link with science interest and there was also a lack of correlation between science interest and interest in leisure activities with either literary or artistic bias.

Various studies of the relationships between pupils and their teachers, their friends and their parents, yielded some interesting results.

No significant link was found between interest in science and attitude to the science teacher but, rather surprisingly, there was a low but significant link with attitude to the English teacher, possibly because she was equated in the pupil's mind with the educational process as a whole. There were no significant links between the stated attitudes of either the science or English teachers towards their pupils and those pupils' measured interest in science. Attitudinal relationships, though, between pupils and their parents were highly significant, particularly the correlation of the interest scores with a pupil's appraisal of both his father's and his mother's interest in science. Correlations of a pupil's science interests with the stated scientific attitudes and interests of his parents were of only borderline significance. There was some evidence of a breakdown of communication between parent and child on either's attitudes to science, particularly in the cases of the pupils' mothers. Evidence from case studies suggested that the home probably exerted a dominant influence in the determination of the level of interest in science; especially significant were the attitudinal relationships between parent and child and the extent of democratic, stable and co-operative behaviour in the home. The social status of the occupation of the father, however, seemed to be quite independent of his child's level of scientific interest, and there were no significant differences between the science interest scores of pupils whose mothers were employed and whose mothers remained full-time housewives.

Moderately high correlations were obtained between the science interest scores of pupils and their class-mates. Sociometric data indicated that pupils selecting one another for certain school activities shared common interests, but that the correlation between the science interest scores of accepting pairs was not necessarily higher for science-type activities than non-science-type activities. There were even low but significant links between the interest scores of mutually rejected members of a pair, suggesting that even enemies tended to be selected from a pool of pupils with somewhat similar interest levels.

Finally, data were assembled on the relationships between a pupil's level of scientific interest and the interest in and awareness of his informational background. Of some twenty-five possible sources of scientific information, only interest in those obviously related to science (such as doing experiments at home or school science activities) were related to science interest, with the exception of interest in visiting museums and in reading daily newspapers. Interests in such possible sources of information as television, radio, cinema, conversations with friends and parents, reading novels, books of non-fiction, weeklies or comics, and in various hobbies, club activities, or recreational games, were quite independent of interest in science. However, when pupils' estimates of the amount of scientific information obtained from these various possible sources were correlated with science interest scores, nearly all were found to be significantly linked; indicating that the higher the interest in science, the greater the amount of information likely to be obtained from the informational background even when exposure to this background was the same for pupils liking and disliking science.

(iv) Conclusion

While it was not possible to establish causal links between science interest and the various factors found to vary significantly with it, it *was* possible to make a series of tentative recommendations which should, if implemented, have cumulative effects on the increase of science interest among secondary pupils. These recommendations have been fully set out in the unpublished report.*

---

*The author owes much to his tutor, Dr. C. M. Fleming, whose careful guidance and encouragement were greatly appreciated. Mrs. A. P. Edwards Æenfold helped with information on statistical methods and I am most grateful to her. Grants were made available from special funds from the University of Sydney and the Australian Commonwealth.s Science and Industry Endowment Fund.—The Research Funds Committee of the University of London awarded a grant of thirty pounds. I acknowledge my indebtedness to these authorities.

GROUP TESTS OF READING READINESS

ELIZABETH J. STANDISH

THE following review of tests is not exhaustive but rather a survey of the current state of this field of research. The writer has tried to group together in a compact and abbreviated form those facts which are available and relevant about the actual material of the tests, followed by an evaluation of the research and methods used in their formulation. As with so many forms of measurement, refinement is proceeding all the time, and information can be quickly out of date. In view of this, the writer would be pleased to hear of additional information regarding these or any other such tests.

The following are all American tests, consequently they reflect considerable cultural differences from this country and should only be interpreted in the light of this. All the tests listed can be obtained from the N.F.E.R. test agency; delivery of those marked † may take up to two months. Copies of all of them may be consulted in the N.F.E.R. test library.

Some of the English publishers of reading schemes supply preparatory books which involve items similar to those used in reading readiness tests. *The Standard Reading Tests* by Daniels and Diack, for example, contain, amongst others, tests of copying abstract figures, copying a sentence, visual and aural discrimination, and letter recognition, but these are individual tests.

The National Foundation for Educational Research has started work on a battery of reading readiness tests for group administration, which it is hoped will be more closely related to the English background. First drafts of tests of auditory and visual discrimination are being tried out now.

1. † **American School Reading Readiness Test, Form D** (1955).

WILLIS E. PRATT, ROBERT V. YOUNG AND CARROLL WHITMER. Public School Publishing Co., Bloomington, Illinois.

Suitability: Grade 1 children (6-year-olds).
Content: Eight tests: vocabulary; discrimination of letter form by selection; discrimination of letter combinations recognition of words by selection; discrimination of letter combinations, recognition of words by selection; recognition of words by matching; discrimination of geometric form; following directions; memory of geometric forms.
Time: The test is not timed (approx. 45 minutes).
Suggested group size: 10-15.
A Manual is provided (copyright 1941, 1955).

The effectiveness of items was determined by selecting items from the Lee-Clarke *Reading Readiness Test*, the Clark—Alice and Jerry *Reading Readiness Test*, the *Metropolitan Readiness Test*, the *Monroe Reading Aptitude Test* and by using the Gates *Primary Reading Tests* administered at the end of the first half of the school year as the criterion of predictive efficiency. On the basis of the analysis of this data, the tests of auditory discrimination were omitted because of their dependence upon variations in administration, but sub-tests were included of: (1) visual discrimination of letters, of letter combinations or phonetic forms, word forms and geometric forms; (2) vocabulary-recognition of simple objects; (3) ability to copy simple geometric forms from memory; and (4) ability to follow directions.

Correlations for each of the eight sub-tests with the criterion test varied from .22 to .43 (kindergarten group) and from .17 to .46 (non-kindergarten group). Co-efficients of correlation ranging from .40 to .67 (kindergarten) and from .33 to .53 (non-kindergarten) were found between the *Detroit Beginning First Grade Intelligence Test* and the sub-tests.

The co-efficients of reliability are: .91± .004 for the half test (split half correlation), and .95± .004 for whole test (Spearman-Brown formula). No data is given on the reliability of the separate sub-tests, even though three tests contain only six items, and the largest number of items in any test is ten.

Norms have been established on 226 pupils from a larger group of 1,091 grade one children from small rural to large urban schools. Two sets of norms are given, since analyses of results of several reading readiness tests showed significant differences between kindergarten and non-kindergarten children although there was no significant difference between the groups for intelligence. The results of this test are given in the form of predicted reading grades and " should be regarded by the teacher as tentative."

This test is clearly set out in bold type. Drawings are adequate in size but sometimes difficult to identify. Test 4 is poorly spaced. Practice items are included for all tests except that of memory of geometric forms.

2. † **Diagnostic Reading Tests.** Survey Section: Kindergarten—Fourth Grade (1957). Committee on Diagnostic Reading Tests, Inc., 419, West 119th Street, New York 27, New York.

Suitability: Kindergarten—Grade 1 (5-6-year-olds).
Content: Two booklets:
  (1) *Reading Readiness, Booklet Form B.* Five tests: relationships [(*a*) making figures, (*b*) marking figures]; eye-hand and motor co-ordination—left to right approach (copying); visual discrimination (seeing likenesses in figures, seeing differences in words); auditory discrimination (initial sounds); testing vocabulary (pictures and numbers).
  (2) *Booklet I: Grade 1. Form A.* Four tests: visual discrimination (seeing differences); auditory discrimination (initial and end sounds, silentness—letters heard/not heard); vocabulary (sight words, matching words with pictures and numbers, writing names of objects); story reading (word attack, comprehension).
Time: No timing is given.
Suggested group size: No group size is suggested.
Manual: A duplicated manual with separate directions (copyright 1957) is provided.

Research is still in progress on this test. A re-check on the reliability of part and total scores, an examination of relationships between teachers' predictions and test scores, and a study of the relationship between grades given in reading at end of first and second half of the year and test scores, are planned.

The second edition of the Reading Readiness Booklet printed this year, is to include changes in format and wording of directions.

The authors claim that this is the only test which provides reliable norms on readiness skills, although it may be argued that norms are less relevant to a diagnostic test, concerned with the state of an individual's abilities, than to an attainment test comparing the individual's level with his group. The tests are supposed to be used by the teacher to determine areas in which children are and are not ready, in conjunction with the activities of a play nature described in Reading Exercises, Level O, which will " build in " readiness in the deficient areas.

The appearance of the tests could be improved. They are printed on newsprint since the booklets are considered by the authors to be expendable. To use expensive paper would increase the cost of the test, but newsprint is very flimsy and probably not suitable for young children's use. Drawings are clear and recognisable but sometimes poorly spaced. The size of print varies from one test to another in the same booklet. Some sub-tests may be too long for young children.

3. **Gates Reading Readiness Test** (1939).
Arthur I. Gates, Bureau of Publications, Teachers' College, Columbia University, New York.

Suitability: Grade 1 (6-year-olds), but this test may be given at end of kindergarten.
Content: Five tests: picture directions; word matching; word-card matching; rhyming; letters and numbers (an individual test).
Time: The test is not timed (approximately 45 minutes).
Suggested group size: None given. Probably 10-15 maximum.
Manual: The manual (copyright 1939, revised 1942) contains a bibliography.

Studies described in the *Elementary School Journal*, Vols. 38 and 40, were used to obtain test items. The average correlation between test scores (obtained beginning of term and scores on *Gates Reading Tests*, Types I and II, at end of term) was +.706 (.89, .91, .78, .69, .59, .57). No information is available on the size and composition of the sample used though it is stated to be drawn from seven New York City public school classes. Five classes from schools in Columbia produced a median correlation of .76 (.79, .76, .76, .63, .53), but no data is provided on the size or composition of the sample nor on the reading test used. When scores on the *Pintner-Cunningham Intelligence Test* were added to the Reading Readiness score, multiple correlations giving an average figure of .76 (.93, .82, .80, .69, .67, .64, .77) were obtained, increasing the co-efficients in four and not at all or slightly on three of the seven New York City classes. Gates recommends that when an intelligence test is used it should be given about the same weighting as any one of the five sub-tests in his Reading Readiness Test.

The reliability co-efficient for the whole test is .974 (Split-half of each test Spearman-Brown formula) on a sample of 174 New York City children tested at the beginning of first grade. (Individual test reliabilities are: picture directions .84; word matching .78; word-card matching .82; rhyming .84; letters and numbers .96.)

There is no information in the manual on the procedure adopted to obtain norms, but presumably they were based on the above data.

Some of the test pictures are too small and detailed for young children, but the layout of words is clear and simple. Construction of word-cards for the word-card matching test is time-consuming, and this test procedure probably is not suitable for young children.

4. † **Harrison-Stroud Reading Readiness Profiles** (1955).
M. Lucile Harrison and James B. Stroud. Houghton Mifflin Company, Boston.

Suitability: Grade 1 (6-year-olds).
Content: Six tests: using symbols; making visual discriminations (attention-span controlled, uncontrolled); using the context; making auditory discriminations; using context and auditory clues; giving the names of the letters (being an individual test).
Time: The test is not timed (approximately 1¼ hours, but it can be given in three half-hour sessions).
Suggested group size: 12-15.
Manual: A manual (copyright 1950, 56) is provided.

The test items were selected on the basis of the difficulty and discrimination index for each item, from a pool of items tested on a sample of 430 first grade children in one particular city. Retained items had an average discrimination index of .53. The test was standardised on a sample of 221 children from one city in 1950, and five years later a further standardisation was completed on 1,400 children from 32 communities in 28 different states.

No information is available on the reliability of the test. About validity, the authors state that " since the various tests were chosen to be direct measures of the specific skills that a pupil needs in beginning to learn to read, validity was built into the tests from the beginning." Selection of items is justified on the high value of the average discrimnation index, and therefore no data exists concerning the prognostic value of the scores when used alone or in combination with intelligence scores.

This test determines whether specific readiness skills are sufficiently well developed for the pupil to profit from reading instruction using a reader in a reading series, and to find in which of the skills he needs further training. The battery of tests is most attractively set out and interesting use has been made of colour in the printing, layout and carefully prepared directions which include adequate practice items.

5. † **Lee-Clark Reading Readiness Test** (1951 Revision)
J. Murray Lee and Willis W. Clark. California Test Bureau, 5916 Hollywood Boulevard, Los Angeles 28, California.

Suitability: Kindergarten and Grade 1 (5-6-year-olds).
Content: Four tests: recognition of similarities in letter forms; recognition of differences in letter forms (1943 Revision); vocabulary and concepts; recognition of similarities and differences in letter and word forms.
Time: The test takes about 15 minutes).
Suggested group size: 10-15.
Manual: A manual (copyright 1951) is provided and includes a bibliography.

The correlation of test scores (1931 edit.) with the *Lee-Clark Reading Tests—Primer* was .67 (N=72). In another group of 374 children (of above average ability) the correlation was .43; this is explained as due to the smaller proportion of children with low reading readiness. The correlation between the Test (1943, 1951 Revisions) and the *California Test of Mental Maturity, Pre-Primary Series* was .65 (N=377). In 1950, a correlation of first grade predictive measures (*Lee-Clark Reading Readiness Test* and *Pintner-Cunningham Intelligence Test*) with Sixth Grade Reading Achievement (*California Reading Test*) was .464 (N=275).

The reliability has been determined by using the split-halves method on scores of 170 entering first grade pupils corrected for range, and this gave values varying between .83 and .94 for the sub-tests, and .93 for the total score.

The norms given are based on 5,000 cases, and two sets are provided for use with children tested shortly after entering first grade or three or four months prior to entering first grade.

The test is short enough to be completed at one sitting and easily scored. The prominence given to capital letters might be questioned. Concepts such as " the empty boat " in the vocabulary test probably involve considerations other than strictly those of vocabulary.

6. **Metropolitan Readiness Tests: Form R and Form S** (1949)
Gertrude H. Hildreth and Nellie L. Griffiths. World Book Company, Yonkers-on-Hudson, New York; and Chicago, Illinois.

Suitability: End of Kindergarten or beginning Grade 1 (5½-6-year-olds).
Content: Six tests: word meaning; sentences; information; matching; numbers; copying. This test is available in two forms and includes a number readiness and a draw-a-man test (10 minutes).
Time: The test takes one hour.
Suggested group size: Up to 15.
Manual: A manual (copyright, 1948, 49) is provided and includes a bibliography.

First published in 1933, these tests have since been improved both in format and procedures. The three experimental forms of the test, including both new items and those previously used, were given to 2,600 first grade children, the difficulty and validity scores for each item being used to eliminate ineffective items and to provide items for the two final forms, carefully balanced for difficulty. The equivalence of the two forms was checked by a try-out on 1,500 first grade children who were given both.

The correlation between the Test (1948, Tests I–4) and the (average) Reading score on the Primary I Battery of the *Metropolitan Achievement Tests* given six months later, was .475. Separate correlations for the sub-tests varied from .341 (information test) to .486 (matching) on a sample of 487. Additional investigations of the validity of the tests are in progress.

A reliability coefficient of .828 was obtained between the Reading Readiness scores on the alternative forms, administered a few days apart. (Average N=195, beginning first grade children.)

The norms were based on 15,081 white children from 56 communities in 26 states. Tables are provided by which the total readiness score (total raw score) can be translated into a percentile rank, and the reading readiness, number readiness, and the total readiness score translated into a letter rating with verbal descriptions.

The battery includes a test of number readiness and the optional draw-a-man test for determining stages of mental development. The test of information seems very similar to that of a test of mental maturity. Although particular attention has been paid to the drawings, many are still too small and detailed for young children. Some items and words, familiar in the American context, would prove more difficult for English children, e.g. hatchet, moccasin, May basket, Hallowe'en, drug store, Fourth of July.

7. † **Murphy-Durrell Diagnostic Reading Readiness Test** (1949)
HELEN A. MURPHY and DONALD D. DURRELL. World Book Company, Yonkers-on-Hudson, New York; and Chicago, Illinois.

Suitability: Grade 1 (6-year-olds).
Content: Three tests: auditory discrimination; visual discrimination; and learning rate.
Time: The test is untimed (approximately one hour).
Suggested group size: No group size is given.
Manual: A manual (copyright 1949) is provided.

On the basis of individual studies of some four thousand children who had experienced difficulty in learning to read, the authors concluded that the important causes of failure were lack of auditory discrimination of word elements, lack of visual discrimination of differences between words, and the improper adjustment of instruction to learning rate. The present form of the two discriminating tests was based on data of item difficulty obtained in test try-outs. The third sub-test, that of learning rate, determines the number of words, from a selected list, each child is able to learn in one day under standard conditions of presentation. The authors experimented with tests varying in length from 5 to 12 words, finally choosing a test of 10, as the most suitable length. There is no evidence given for this decision, although they do explain their considerations in regard to the choice of words.

No evidence of test validity is provided but the authors, drawing on their experience and on other experimental data demonstrate the importance of the assumptions upon which the test is based.

The reliability (split half) of the Auditory Test was .96, the Visual Test, .95 (N=225 first grade children).

No norms are given for the test of learning rate. Percentile norms are given for the other two tests, based on the scores of 5,000 first grade children, about half coming from Boston public schools and half from eight communities in five states, mostly in the New England area.

The use of flash cards for the visual test may prove distracting for young children, who may find it difficult to refocus each time on the well-filled page of items. Words used are carefully graded in difficulty but it is doubtful whether all children would be capable of continuing the test over the page without instructions to do so. Advocates of reading for meaning and those who teach by using children's interests would probably criticise the learning rate test.

8. † **Reading Aptitude Tests. Primary Form** (1935)
MARION MONROE. Houghton Mifflin Company, New York.

Suitability: Grade 1 entrants (6-year-olds).
Content: Eight group and nine individual tests: the group tests include three visual, two motor, two auditory and one language test; the individual tests include one auditory, two articulation, one language, one motor, and laterality tests.
Time: The group tests take 30-40 minutes; the individual tests 10-15 minutes.
Suggested group size: The recommended group size is 10-12.
Manual: A manual (copyright 1935) is provided.

The predictive value was determined by correlating percentile scores made on the test on entering first grade with scores made on Gray's *Oral Paragraph* and the *Iowa Word Test* given at the end of the year. The composite reading attitude percentile score proved the best predictive item (.75) followed by the auditory (.66), visual (.60), articulation (.57), language (.50), and motor tests (.50), (N 85). When left-eye preference was considered separately, this test had some significance in that half the children found in the lowest quartile on the reading tests were left-eyed compared with thirty-six per cent. of those in the upper quartile. The norms show that high and low scores on the total test are good predictors of success or failure in beginning to read.

The reliability co-efficient for the entire test was .87, corrected by the Spearman-Brown formula (split-half).

The norms were established on records of 434 children from 5½-8½ years of age, data being obtained in the course of work on reading disabilities in co-operation with the Pittsburg Public schools.

The test is used both as a diagnostic and as a reading readiness test. The use of flash cards (test of memory orientation of forms) is probably the only feasible method but is still likely to prove confusing to young children. The method of testing word discrimination is unnecessarily complicated, involving the identification of numbers in substitution for words in selecting the correct words for answers. It would be interesting to know the relative contribution of the sub-tests to the visual and auditory scores and the correlations between the individual sub-tests of visual and auditory discrimination and the criterion tests.

Other Group Tests of Reading Readiness

A number of other tests mentioned in accounts of research have been either discontinued, are out of print or otherwise are unavailable. Among these are:

(1) *Group Test of Reading Readiness, Dominion Tests.**
(2) Webster *Reading Readiness Test.*
(3) Betts *Ready to Read Test.*
(4) Stevens *Reading Readiness Test.*
(5) *New York Reading Inventory.*
(6) *Van Wagenen Reading Readiness Test.* (This has been discontinued and replaced by the School Readiness Test.)

---

*Since the above went to press, this test has become available. Its specification is as follows:

†**Group Test of Reading Readiness : The Dominion Tests** (1949). Long Form.
Department of Educational Research, Ontario College of Education, University of Toronto, 371 Bloor Street West, Toronto, 5.
Suitability : Kindergarten—Grade 1 (5-6-year-olds).
Content : Five tests : discrimination of object, symbols, words, listening, remembering, observing ; familiarity with word forms ; memory for word forms ; motor co-ordination and reproduction of drawing details.
Time : 50 minutes.
Suggested group size : Not more than 12-15.
A *Manual* is provided (1949, 51).

© *National Foundation for Educational Research in England and Wales.*

Printed by King, Thorne & Stace Limited, 1-13 Jubilee Street, Brighton, 1,
and published by Newnes Educational Publishing Co., Ltd., Tower House, Southampton Street, Strand, London, W.C.2.,
for The National Foundation for Educational Research in England and Wales, 79 Wimpole Street, London, W.1.

Volume II, No. 3 June, 1960

EDUCATIONAL RESEARCH

A Review for Teachers and all concerned with Progress in Education

Published for
THE NATIONAL FOUNDATION FOR EDUCATIONAL
RESEARCH IN ENGLAND AND WALES

by

NEWNES EDUCATIONAL PUBLISHING CO. LTD.
Tower House, Southampton Street, Strand, London, W.C.2

The Education of Exceptional Children—III

EDUCATION OF THE DEAF

by A. W. G. Ewing

Department of Education of the Deaf, University of Manchester

RAPID developments in the type of provision made for children handicapped by deafness are today in progress. Some involve experiments in education, most implement in some way results of research. All are of direct concern to medical authorities, administrators, educationists and psychologists. Many have implications of significance extending far outside the field of education of the deaf.

For ten years or so, after 1946, in England and, to varying degrees, in other countries, the main alternative forms of special school placement for children with defective hearing were: (*a*) schools for the deaf—for " children with no naturally acquired speech "; (*b*) schools for the partially deaf—for " children with naturally acquired speech "; and in a small minority of cases (*c*) schools for " deaf children with additional handicaps." The London County Council established units for partially deaf children attached to primary day schools and the Lancashire County Council appointed peripatetic teachers of the partially deaf. These two authorities apart, the trend in England was to open new residential schools—for the deaf and also for the partially deaf.

Today, with much greater diversification well under way, a reappraisal of our basic knowledge about the problems involved is long overdue. This article cannot claim to be comprehensive but it is an attempt to present some of the salient facts.

Provision for Partially Deaf Children in Ordinary Schools

First, for administrators especially, is the question of the number of children involved, how to find them and how to classify them. There is evidence of a growing and international tendency to recognise and classify as needing special treatment two categories of auditorily impaired children for whom no general provision has hitherto been made and have rarely been included in official returns. One consists of pupils in ordinary schools, who are not considered to need full-time special schooling, but are now being found, on investigation, to have both social and educational problems, the other of very young children whose hearing is defective.

Rojskjaer has reported progress in Denmark towards organising " comprehensive audiological work for the benefit of the *whole* population as such." In 1958, there were 600,000 children in Denmark aged under seven years and 550,000 children aged seven to fourteen years. Of these, 1,690 children were " under audiological treatment." There were 500 children, aged seven to fourteen years, in attendance at State schools for deaf and severely hard of hearing, and 865 attending ordinary schools, of whom 745 had hearing aids. Under seven years, were 325 children, 275 with hearing aids, including 20 children under two years old. It will be noted that the number of children with hearing aids in ordinary schools much exceeded the number of pupils in special schools for the deaf and hard-of-hearing.

To obtain somewhat similar information about the present situation in the United Kingdom, we have asked the School Medical Officers of large and small county and county borough authorities for information under six heads. They co-operated very willingly and the following provisional table is a result:

TABLE I

Children with Impaired Hearing

(Total school population, approximately 2,500,000)

Type of Placement	*Number per thousand Children*
Schools for the Deaf	0.5
Schools for the Partially Deaf	0.27
Special classes attached to primary schools	(total approximately 240 children)
Ordinary Schools, with hearing aids	0.5
Ordinary schools, with significant impairment of hearing, no hearing aids	2.0
Number of peripatetic teachers of partially deaf children in ordinary schools	19

(NOTE: This table is based on part of the data that are at present being studied by Mr. J. C. Johnson, Nuffield Research Fellow, Department of Education of the Deaf, University of Manchester, who is completing a full-time investigation of the problems of children with impaired hearing in attendance at ordinary schools.)

A significant feature of the data upon which this table is based is that two large authorities, both with their own schools for the partially deaf, have in addition as many as 0.72 and 0.58 per thousand of their ordinary school population equipped with hearing aids. One of the areas involved is heavily industrialised and the other part-urban and part-rural. A survey of children with defective hearing in Cheshire is being made by members of the staffs of the Department of Education of the Deaf and the Department of Otolaryngology, University of Manchester, and the School Medical Officer for Cheshire and his staff. It seems likely to indicate that the number of children in ordinary schools with psychological and educational problems due to partial deafness equals that of children with defective hearing in special schools. To meet the needs of children in this category local authorities in England and Wales have appointed some twenty or thirty peripatetic teachers, many of them recently. In Denmark there are about 100 of these teachers.

In the United States of America the total number of children quoted in the annual returns published in *American Annals of the Deaf*, as receiving special education because they were deaf or hard-of-hearing, was 18,316 in 1947, and 25,155 in 1959. In the latter year, 5,964 children were stated to be attending special public day classes, a type of provision that was not mentioned in 1947.

These developments inevitably prompt questions. Just how comprehensive is our ascertainment and treatment of defects of hearing among children, either from the medical or from the social and educational angle? What has organised research to tell us, so far, about the suitability and potential efficiency of different types of schooling for different categories of auditorily-handicapped children? More fundamentally, what knowledge have we of the actual composition of those sections of the child population to which the terms deaf, partially-deaf or hard-of-hearing are generally applied? It will not be inapt to quote Kerr Love, one of the earliest British medical consultants to make systematic studies of pupils in an institution for the deaf. He wrote that their one common characteristic was inability to benefit from attendance at ordinary schools.

Provision for Very Young Deaf Children

Before seeking answers to our questions we must take account of growing provision for the detection of deafness in infancy and early childhood and for the early training of very young children whose hearing is defective. Pioneered, in England, by the late Lady Ewing, partly as a result of her earlier experience in charge of a new special school for young deaf children, this work is now regarded, internationally, as of key importance in the education of the deaf. It is principally carried on by means of audiology and parent-guidance clinics in universities, hospitals, public health departments and schools. In 1958, Owrid, administering his Language Scale for Deaf Children to 500 pupils in schools for the deaf, found that those who had had home training (some of them from before the age of one year) were significantly superior to other pupils in linguistic development. More recently, Beaman, at Manchester, made periodic sound-recordings of the vocalisation and early speech of 60 children of pre-school age, who were having home-training, with hearing aids, by their parents under her guidance. The children were assigned to three sub-groups according to degree of deafness, and the recordings were transcribed and analysed. Beaman found that some of the severely deaf children became able to perceive the sound-patterns of speech on the basis of hearing alone. They learned to talk. Other less handicapped children, after a period of training acquired, spontaneously, a range of vowel and consonant phonemes and frequency of utterance that can be considered to come within normal limits. Certain children, in both these groups, were demonstrated by Beaman at the International Congress on the Modern Educational Treatment of Deafness, held at Manchester University in 1958. For example, M., aged 5 years 10 months, with hearing losses 35-70 decibels, and T., aged 6 years 6 months, with hearing losses 30-55 decibels, were seen and heard by the audience conversing freely and fluently together about topics of mutual interest. Both were reported to be managing without undue strain in an ordinary class, in an ordinary school. J., a profoundly deaf child, aged 3 years 6 months, used her voice well and spoke intelligibly, depending greatly on combining the use of a hearing aid with lipreading. Of Beaman's group of 60 home-trained children, seven are now in ordinary schools and eight in schools or units for the partially deaf. Most of the rest are in schools for the deaf and the parents of some are continuing to have guidance about their home training. Huizing, Professor of Audiology at Groningen University, has reported similar cases.

These results support certain earlier findings from studies of more than 240 children, by Ewing, Watson and Pickles (using developmental schedules to assess progress), at Manchester, and by Whetnall and Galbraith in London. Clinical observations and sound-recordings have long shown that an appreciable proportion of home-trained children with hearing impairments become able to talk colloquially rather than in the more formal kind of language that pupils tend to develop in schools for the deaf. Spectographic analysis, which reveals the time-pattern and frequency-intensity patterns of speech, when recorded, confirm the greater normality of their phrase and sentence forms.

Wedenberg, making experimental studies of the response to auditory training initiated at the age of three years, of 36 severely deaf children, found a relationship between the amount of advantage that children obtained from using a hearing aid and the pattern of their audiograms, i.e. the frequency-intensity characteristics of their deafness. He noted also differences in the quality of their voices and the intelligibility of their speech. Of 20 pupils who had reached school age, when Wedenberg wrote his article, three were attending ordinary schools, five public classes for the hard-of-hearing, four schools for the hard-of-hearing, seven schools for the deaf, and one a public school class for retarded children.

As a result of tests and psychological examinations of 370 deaf and 370 ordinary children, aged 18 to 65 months, Kendall at Manchester concluded that the handicap of deafness involves and threatens social and emotional development no less than linguistic and intellectual development. He noted " The mental health of deaf children of pre-school age . . . can only be assured if adequate attention is paid to their needs during this important developmental period. Predominantly and over-ridingly, deaf children need to be given an effective means of communication with other people in their environment." Since Kendall wrote these words repeated clinical observations of the results of the use of hearing aids with very young children have shown that those with whom their parents and others succeed in establishing contact through hearing, or to an appreciable extent by means of it, usually exhibit more normal patterns of social development, of play behaviour and indeed of general mental growth than those with whom parents can make contact only through vision and touch and who spend their earliest years without meaningful experience of human voices and speech. Taylor has analysed some of the factors involved. It is more difficult for parents of young children who are sub-totally or totally deaf to establish and maintain an equally close relationship with them, without the dynamic factor of communication through sound. Nevertheless, some parents achieve it.

Reporting, in 1953, on studies at John Hopkins University, Baltimore, of the hearing for speech of 572 children aged four months to five years (of whom 456 proved to have impaired hearing), Pauls and Hardy wrote, " Treatment and training should be begun as early as possible in the child's life. The period from eighteen to thirty months seems best. The child between the ages of two and five years is at his peak as a language-learning individual; never again will he exhibit such a state of readiness, need and desire for the acquisition of speech and language. So far as the tools of communication are concerned, the child's career does not begin at school, but in infancy."

Detection of Deafness in Infancy and Early Childhood

The urgent importance of detecting deafness in what are normally the pre-school years is now widely admitted by many public authorities in the United Kingdom, the

United States, Denmark and other countries. It is accepted that very young deaf children, (*a*) should have the opportunity of effective and continuous auditory experience, and (*b*) should have training from as early an age as their deafness can be detected.

It has been found that special procedures have to be applied to test hearing in babies and young children. We have reported elsewhere that medical investigation of the histories of pupils in schools for the deaf, in England, showed that 70 to 80 per cent. had their disability from before the age of two years. Best, in America, estimated that the impairment occurs before five years " in over 90 per cent. of the deaf group." In 1958, Harrison stated that of 354 cases of deafness in childhood studied by our joint team at Manchester, 261 were cases of perceptive deafness, which often is unassociated with pathological changes in the middle ear. Perceptive deafness is frequently detectable only by means of tests of hearing. In the absence of such tests ascertainment of deafness in young children is often delayed for several years.

There are two main approaches, in practice, to this problem. The first is to provide short courses of training for medical officers and health visitors in screening tests of hearing that are developmentally based and applicable in infancy and early childhood, such as those evolved in 1942 by Ewing and Ewing. As far as possible, all children in selected age groups, especially those aged nine to eleven months, who come under the care of the maternity and child welfare staffs, are tested. Also the attention of general practitioners is drawn to the availability of trained workers who can make the tests in health centres or in children's homes. The Medical Officer of Health for the City of Manchester reported that, in 1958, 552 children were given screening tests of hearing in three child welfare centres. As a result, 16 were referred to the diagnostic clinic at the Department of Education of the Deaf. In the same year, Humphreys stated that of 5,494 children under five, to whom the screening tests had been given in the City of Leicester, 6 had been found to be profoundly or sub-totally deaf, one was found, after otological examination, to be suffering from severe middle-ear disease, one had multiple congenital handicaps and was under paediatric care, and two others, although tested on three occasions, were not responding normally to sound. Humphreys emphasised that the screening tests were carried out by health visitors as part of their normal duties.

Medical officers and many health visitors in the service of the Cheshire Health Department have attended courses in the screening tests of hearing and they are widely used in the county. Forty-three children, under five years, are already known to have defective hearing. There are about 60,000 children in the county within this age-range. A sampling survey of the hearing of an age-group of babies is now planned.

As an alternative to making screening tests of the hearing of all babies and young children, Howorth has published results of the use of the tests in Lancashire with special concentration on children under five years old in nine vulnerable or risk groups. Children were selected for testing on a basis of family history of deafness, history of virus infection of the mother during pregnancy, etc., and children not speaking well.

Through tests of 662 children in vulnerable groups, Howorth found 6 with defective hearing, of whom one was aged under two years. Through tests of a general population of 5,531 children she found 14 with defective hearing of whom 6 were under two years of age.

In the United States, from the Johns Hopkins Medical Institutions, J. B. Hardy, Dougherty and W. G. Hardy, as part of a general study of infantile development, examined 502 babies, of whom 348 were between three and thirty weeks old. They concluded that their screening tests " give promise of good effectiveness as a general public health measure for use with infants of six months of age " and " are quite effective as a special test in the hands of well-trained personnel for infants in the range between one and six months."

Summarising what is known about this part of our subject, it may be said that special procedures have been found to be effective in detecting incapacity to respond normally to sound, among babies and young children. A preliminary inspection of the statistics now being collated at Manchester shows that there are wide variations in the numbers of deaf children under five who are known to different health authorities. Wherever special steps have been taken to ascertain them, or to provide parent-guidance in audiology clinics, the numbers known to authorities have much increased. It is clearly urgent that this work, which, already, in England, has the approval of the Ministry of Health, be placed on a national footing.

Detection of Deafness among School Children

Statistics about the incidence of defective hearing among school children in different counties and county boroughs in the United Kingdom vary considerably. There has been increasing acceptance of the importance of screening children's hearing by the sweep-frequency technique of pure-tone audiometry, though it is not infrequently said that adequate staff is not always available. Walby reported that, in the City of Belfast, 585 children (10.4 per cent.) of 5,630 sweep-tested at school in 1958 failed to pass in both ears at six frequencies (500 to 8,000 cycles per second) at a sound level of 20 decibels. In the United States, District of Columbia, a recent investigation on use of sweep-check screening with 4,393 children, by eleven trained audiometricists, has been reported by Copenhaver and Campanelli. As in Belfast, the failure criterion was a response above the 20 decibel level, in either ear, at one or more frequencies. The number of children who failed was 327—approximately 7.5 per cent.

The main conclusion that can be drawn from the results of this type of investigation seems to be that, as in the case of screening tests of the hearing of babies and young children, many impairments of hearing are brought to notice that have not previously been diagnosed or treated. In Reading, with a school population of 18,000, some 3,000 school-children aged five years underwent sweep-frequency testing in 1957-59. Approximately 150 each year are stated to have been successfully treated for ear troubles at the Royal Berkshire Infirmary. In November, 1959, 32 children were classified as needing special educational treatment on account of partial deafness. Fourteen of them, however, had not been born locally, their parents having moved into the town because of its provision of day-units, attached to ordinary primary schools, for children with defective hearing. Between 1955 and 1959, 21 children were admitted to a special class for seven to eleven-year-olds and between 1957-1959, 14 children were admitted to a special nursery-infant class. The hearing losses ranged from an average 20 decibels to an average 100 decibels. In addition, several children from Reading were attending residential schools for the deaf or for the partially deaf elsewhere. Of the 35 children under twelve years admitted to the special units in the town, 16 had been transferred to ordinary schools after periods of educational treatment in the special units varying from two terms to four years.

These figures have been quoted in detail because, like those for Denmark, they are the result of what must be described as a clearly-defined policy, strongly supported by higher authority, to deal comprehensively with deafness in childhood by close co-ordination of the work of medical officers, medical practitioners and consultants, audiologists, psychologists and teachers of the deaf acting in various capacities.

Incidence of Defective Hearing among Children

The Danish figures of incidence among children with defective hearing that calls for some form of special educational treatment seem likely to be the most reliable. On the basis of those quoted earlier in this article, one per thousand of all children aged seven to fourteen years are pupils in State schools for the deaf and severely hard-of-hearing, 1.34 children per thousand attend ordinary schools with hearing aids and help from peripatetic special teachers, and a further 0.2 are classified as " under audiologic treatment," while attending ordinary schools without hearing aids, giving a total of about 2.25 per thousand. It seems probable that the findings of our Cheshire Survey may present a somewhat similar picture, as the Reading reports, and that a total of about two per thousand school children may need special educational treatment, on account of defective hearing, in comparable socio-economic conditions.

Medical and Surgical Treatment

Examination of available information indicates an urgent need of more surveys that include investigation of defective hearing among children in terms both of medical and educational treatment. No data derived from large populations are yet available—or perhaps even exist—that tell us to what extent the considerable percentages of children found by sweep-frequency screening tests to have impaired hearing are being reduced by modern medical or surgical treatments. Cawthorne, Otological Consultant to the Ministry of Health, and Goodhill, Consultant in Otolaryngology, Children's Hospital, Los Angeles, have referred to new forms of therapy and operative procedures to which forms of middle-ear deafness are proving amenable. Cawthorne has said that the child who is unduly susceptible to colds and who always goes deaf with a cold can present quite a problem. Our clinical experience includes many such cases. Every incurable deafened child, he has stated, should be seen by an otologist once each year, in case " a super-added conductive deafness" may be preventing the child from making what use of the hearing that he has.

These medical needs and potentialities have much relevance to the results of educational research. Screening tests of the hearing of school children clearly have great value in that they find many previously unreported cases of children who need either medical or educational treatment for deafness—or both. Among 148 children of school age whom medical officers, consultant otologists and consultant paediatricians have referred to our joint otological-audiological sessions in the Department of Otolaryngology at Manchester University, in 1958/59, 65 were eight to ten-plus years old, and 42 were aged eleven to sixteen-plus years. In a majority of cases the onset of deafness had been in infancy and early childhood. The importance of measures to secure earlier attention to such cases need not be stressed. Cases still occur in which children diagnosed as mentally-retarded and placed in special schools or classes on that account, prove to be handicapped by deafness and make good progress in mental growth and educational treatment when transferred to schools or units for the partially deaf or for the deaf.

Pure Tone and Speech Tests of Hearing

There are several modern forms of screening tests of the hearing of school children. In England, in 1954, as a result of Midgley's investigation at Manchester, the Medical Research Council recommended individual sweep-frequency pure-tone testing at five or six years of age, at frequencies 250 to 6,000 cycles per second. This technique probably continues to be the most reliable and least time-consuming for general use with all kinds of children. It is important that pupils should be tested as soon as possible after admission to school, to avoid risk that those with defective hearing may become failures with all the damage to emotional and social development as well as to educational attainment of which we see evidence in our clinics, week by week. Watson has constructed and standardised speech tests of the hearing of English school children. Increasingly, we find at Manchester that as in the case of babies, it is desirable to make tests of children's capacity for auditory discrimination as well as of their auditory acuity. Speech audiometry is an essential technique in audiology clinics and diagnostic sessions. Its use for screening tests of the hearing of school-entrants presents a problem in terms of the time needed to give each child a long enough list of words or sentences to test his hearing reliably.

Reliability of Tests of Hearing

In 1949, Watson and Tolan, after summarising the varying results of many different surveys, involving several million American children, referred to differences in the calibration of audiometers, in procedures for testing children and in the efficiency of audiometricians. The first of these variables can now be brought under control by insistence on the calibration of audiometers to the British Standard zero reference level. (Hallowell Davis, of Central Institute and Washington University, St. Louis, has stated that international sentiment favours this rather than the American standard.) Variables in procedures and proficiency can best be controlled, we believe, by the training and appointment of expert audiologists to take charge of personnel who make screening tests of children's hearing, in all units of county borough and county size. A one-year, full-time, advanced course leading to a Diploma in Audiology, was established at Manchester University, for this and other purposes, in 1958. Qualified audiologists are capable of submitting results of screening tests to periodic statistical analysis and of reviewing procedures and equipment in the light of developing knowledge.

Deafness, Linguistic Development and Educational Attainment

It will have been noted that at Reading a child with an average hearing loss of 20 decibels was considered to need special educational treatment. Brereton, of the Commonwealth Office of Education, Australia, in the course of a research extending over seven years, found that it was usual for children with hearing losses of about 45 decibels to reach five-year-old scores in using and in understanding spoken language by the age of about eleven years. We have found that, as Brereton's statements would imply, some children with hearing losses below 45 decibels are linguistically retarded. No direct, or constant, relationship between degree of impairment of auditory acuity and backwardness seems to be indicated. Each child with impaired hearing needs individual, comprehensive examination to determine his hearing for speech, linguistic and social development, abilities and mental growth.

Modern research is revealing the population of children with impaired hearing as heterogeneous to an extent not previously known. It is emphasising sociological and emotional aspects of many of their problems. Before attempting the fresh appraisal of their needs that this new knowledge demands it is advisable to consider the work of schools for the deaf as they now exist. In most countries it is these schools that provide most of the special educational treatment available for children with defective hearing.

In the past, the ambition of well-educated parents of deaf children was frequently to fit them for attendance at ordinary schools, or even universities. In the United Kingdom, Australia and other countries, since 1946, there has been an increase and broadening of the basis of effort towards normalising the education of the deaf in terms of curriculum. There are three secondary schools for the deaf in England and a small but growing number of pupils are taking the General Certificate of Education. At the Mary Hare Grammar School and the Burwood Park Secondary-Technical School, pupils are given science teaching in well-equipped laboratories, very much like their opposite numbers in ordinary grammar or technical schools. Admission is by selection. Ex-pupils of the Mary Hare School, which was opened in 1948, are following successfully a wide range of professional, technical and clerical occupations, as well as others that involve craftsmanship. The Headmaster of the Burwood Park School has reported that ex-pupils now serving apprenticeships are taking technical courses with non-deaf students, in evening classes and day-release schemes, and are needing only a little extra help. Drewry has found sixty-six occupations that have been followed by deaf persons.

Numbers has reported an investigation in which questionnaires were sent to 315 former pupils of the Clarke School for the Deaf, Massachusetts. Of 225 who replied, 89 had completed ordinary High School courses successfully, with non-deaf students, after leaving the Clarke School and 11 were at High Schools at the time of her report. Twenty-nine had taken degrees at colleges or universities, 7 had gained Masters degrees and 2 Ph.D. degrees. Admission to the school is not selective in the ordinary English sense of that word, but a minority of children for whom places are sought are not admitted if found unlikely to benefit from the type of education that the school offers.

Administering the Gates Reading Vocabulary Test to pupils in the Mary Hare School, in 1950, Gaskill found that 4 out of 33 partially deaf pupils obtained maximum scores (reading age = 18 years) and 5 deaf pupils showed vocabulary ages of at least 14 years. In 1956, Bates published results of a research that included a study of 39 pupils of the Mary Hare School during five years. In terms of the Gates Vocabulary Test, 8 pupils who had become deaf after the age of five years had normal scores on admission to the school, 14 other partially deaf pupils were about one year retarded and 17 deaf pupils were two to three years retarded. He found that the deaf pupils in the school progressed at the same rate as normal children but were always between two and three years retarded on average.

In the United States, in 1954, Fusfeld described an investigation of 134 candidates, aged 14 to 21 years, for admission to the preparatory class of Gallaudet College, Washington, D.C. The average age of the male candidates was 19.3 years and of the girls 18.9 years. Meyerson has described them as representing " the intellectual and academic elite " of students graduating from American state residential schools for the deaf. From Fusfeld's findings it would appear that it had taken 18 and 19-year-old candidates over twelve years of schooling to reach a medium grade achievement equal to that of the average American non-deaf pupil of 15 years. The candidates were given the Stanford Achievement Test, Advanced Battery, Form J. Fusfeld did not distinguish in his report between deaf and hard-of-hearing candidates.

The average attainment of pupils in schools for the deaf in the United Kingdom and the United States is considerably less good than that of the two selected populations to which reference has just been made. It must be said at once, however, that the most noticeable feature has been a very wide range of variation. K. P. Murphy, after conducting an investigation from Manchester University, in 1957, published results of administering the Gates Vocabulary Reading Test to 513 twelve-year-old pupils in 36 schools for the deaf. As between schools, mean scores varied from a mean of 4.29 with a standard deviation of 3.59 to a mean of 19.87 with a standard deviation of 16.4. Scores in the Schonell Mechanical Arithmetic Test ranged from a mean of 5.7 with a standard deviation of 5.5 to a mean of 10.0 with a standard deviation of 8.7.

The scale of linguistic development for deaf children, constructed and standardised by Owrid at Manchester, includes three tests of comprehension and use of speech for children aged 5 to 8 + years. There are also developmental schedules based on a study of more than 100 children with impaired hearing who were in attendance at the pre-school clinic in the Department of Education of the Deaf and in nursery schools for deaf children. The tests were standardised on groups of which the smallest included 307 children and the largest 372 children. The reliability figures in each test were high, all being greater than $r = 0.9$. The tests were also administered to 80 children with unimpaired hearing attending ordinary nursery schools. As has been mentioned earlier, Owrid found that there were considerable and statistically significant differences in favour of children who had had home-training, including the use of hearing aids before admission to school, as a result of guidance given to their parents in the University clinic. About three-quarters of the children in each of Owrid's test groups were severely or profoundly deaf. Reference will be made later to two others of his findings that are significant to school placement.

As part of a study of secondary-modern education for deaf pupils, Wollman, of Manchester University, has given tests in English comprehension, language structure and written expression and tests in mechanical and problem arithmetic to 300 pupils between the ages of 14 and 16 + years in thirteen English non-selective schools for the deaf and partially-deaf. An analysis of the results is in progress. Among his tentative conclusions

Wollman reports wide variations in mean scores obtained in different schools. In general, schools occupy the same positions in all four tests.

Causes of Variation in Linguistic Development and Educational Attainment

The causes of these variations demand investigation. In a report to the Medical Research Council's Committee on the Educational Treatment of Deafness, in 1953, Gaskill and K. P. Murphy summarised " general causes of backwardness in deaf children " that included frequent changes of teacher, poor home conditions, late entry, personality problems and lack of incentives to linguistic development. It was clear that all the factors that could cause backwardness among non-deaf children could retard the progress of deaf children. Some difficulties mentioned in the report that were most prevalent during the immediate post-war period, such as shortage of trained teachers of the deaf and, not unrelatedly, absence in some quarters of schemes of work to ensure continuity of teaching throughout schools, have since been considerably remedied. But evidently, variation in deaf children's attainments continue to be great.

Probing more deeply, we note that as a result of testing 150 deaf children with the Alexander Performance Scale of Intelligence, Ewing and Stanton found in 1943, that thirteen per cent. had indices below 60. Six years later Blair Hood, after administering the same test to 401 pupils in special schools for the deaf, reported a bi-modal distribution of I.Q.'s. After administering to 370 deaf children aged 18 to 65 months, the Atkins and certain Merrill-Palmer Tests of Intelligence, Kendall in 1957, stated that he had found a significantly high number of deaf children whom the tests indicated as seriously retarded. He wrote that in almost half the cases where there was severe mental retardation the cause of deafness was associated with either maternal rubella, rhesus incompatibility, or tuberculous meningitis treated with streptomycin, whereas in the group as a whole these factors were only present in a quarter of the cases.

Today, as a result of specific researches of which we began the first some five years ago, factors associated with the causation of their deafness are becoming emphasised as having, in many cases, significance to their development and education.

An important subject of investigation among children with impaired hearing has long been evaluation of their capacity to discriminate the sounds of speech. In 1930, before electronic hearing aids were available, many teachers of the deaf feared that to let partially deaf children hear while undergoing instruction would adversely affect their capacity to lipread. But, the late Lady Ewing wrote, " Hearing is the strongest incentive toward speech and language. It is the basis for the natural development of speech and to deprive (a child) of the sounds that he can hear naturally, is to take from him vital experience in speech and language which can be given him in no other way." In 1936, Ewing, Ewing and Littler, and in the following year Kerridge, reported tests of the capacity of deaf children to hear speech with hearing aids. In the same period similar investigations were begun in America at the Clarke School, Massachusetts, the Pennsylvannia School for the Deaf at Philadelphia, Central Institute for the Deaf, St. Louis and elsewhere. Hudgins, in a recent paper on the basis especially of continuous post-war research at the Clark School, had distinguished children in three categories whom he describes as: (1) hard-of-hearing, with hearing losses that may be placed arbitrarily at 60 to 65 decibels in the speech range of frequencies; (2) partially deaf, with hearing losses between 60-65 decibels and 80-85 decibels; and (3) profoundly deaf, with losses ezceeding 80-85 decibels. He has stated that "The hard-of-hearing group offer relatively minor problems with respect to auditory training. The partially deaf who enter school with practically no speech discrimination and with little or no intelligible speech, respond readily to an auditory training program and often achieve a high degree of communication skill. Many of the children in this group, following training, are able to continue their education in public schools." The profoundly deaf, he said, are capable of responding to training that enables them to use their residual capacity to hear to supplement vision in a bi-sensory process of speech perception. Hudgins has supported this statement with a graph showing the increase over five years, in the capacity to perceive speech by hearing combined with lipreading, of 50 profoundly deaf children.

Our own findings at Manchester support the general trend of Hudgins' conclusions, with an emphasis on the urgent need of all children who have hearing losses between approximately 60-65 decibels and 80-85 decibels to have continuous auditory experience with hearing aids in acoustic conditions that make their use effective.

Causation of Deafness and Capacity to Hear Speech

There is, however, as Hudgins and we agree, no direct or constant relationship between degree of auditory acuity, as measured by pure-tone audiometry, and capacity for speech discrimination, as measured by speech audiometry except, perhaps, in cases of conductive deafness with a middle-ear pathology. This has been notably demonstrated by recent results of speech tests of hearing associated with investigations of causation of deafness. The research has been made jointly by senior members of the staff of the Department of Education of the Deaf and the Department of Otolaryngology at Manchester University, with assistants provided by the Medical Research Council.

Children whose deafness has been diagnosed as associated with certain aetiologies have been found to constitute vulnerable groups as regards capacity for speech reception by hearing alone. The following is a preliminary statement of trends in capacity to hear speech among children in these categories.

TABLE 2 — **Capacity for Speech Reception in Relation to Causation of Deafness**

Causation	*No. of cases*	*Auditory Discrimination*		
		Poor	*Moderate*	*Good*
Conductive deafness	25	0	6	19
Acute infection	10	4	2	4
Unknown–perceptive	36	12	8	16
Heredity	17	7	5	5
Meningitis	16	8	3	5
Kernicterus (Rhesus incompatibility)	13	8	2	3
Kernicterus (of prematurity)	12	8	3	1
Maternal rubella	10	7	1	2
Total	139			

The diagnoses quoted in this table were made by Mr. Kenneth Harrison, F.R.C.S., and the statistics have been collated by Mr. J. C. Johnson and Mr. D. Sanders. The tests of speech-reception are made by speech audiometry with monitored live voice. According to the ages and linguistic development of the children, either the Toy Vocabulary or the Watson Picture Vocabulary Test or the Watson Word-lists are used. Scores, as classified on a three-point scale, in the table above, are those obtained by each of the children at the level of intensity at which he or she heard best. They indicate capacity for speech reception with a very high-fidelity hearing aid, in very good acoustic conditions.

Watson, a member of our team, making an independent study of capacity to hear speech, found that children whose deafness was diagnosed as conductive obtained higher scores, in general, than those with perceptive deafness.

Deficiencies of the Nervous System and Auditory Impairment

It is accepted that some forms of auditory impairment relate to damage within the brain and not necessarily to lesions or deficiencies of the end-organ of hearing—the ear. Crabtree, Cavanagh and others have investigated defective response to sound associated with kernicterus, that is damage to the basal nuclei of the brain by pigmentation as a result of neo-natal jaundice. At the International Conference on Audiology at St. Louis, in 1957, Goldstein, Hardy, Mykelbust and Trenque contributed to a panel discussion on psycho-acoustic development and tests of auditory function. There was general agreement that a number of children suffer from impairments of hearing associated with deficiencies of the central nervous system, .the causation of which can sometimes, but not always, be diagnosed. Mykelbust stated that he had studied 68 pre-school-age children with central involvement and 142 having aphasic and other types of involvement. In England and America obstetrical trauma have been quoted as sometimes responsible for deficiencies in speech reception and dyslalia. Bordley and Haskins have reported from the Department of Otolaryngology of the Johns Hopkins University School of Medicine a research to study patients who " have the physiological ability to hear but are unable to analyse and to comprehend what they hear." They examined especially older adults with defective hearing. They suggest that the difference between the hearing thesholds by standard, subjective audiometry and objective psycho-galvanic skin-resistance audiometry indicates approximately the degrees of sclerosis of the auditory area of the cortex and that this has relevance to incapacity for auditory discrimination in children.

We would agree with the contributors to the panel discussion at St. Louis that among children referred for audiological testing and among pupils in schools for the deaf and partially deaf, there is a significant number who, on paediatric or neurological examination, are found to suffer from deficiencies of the nervous system. Taylor, at Manchester, is investigating this problem in relation to their educational treatment, as well as that of children suffering from some form or degree of cerebral-palsy who have impaired hearing. Fisch, of the Royal National Throat, Nose and Ear Hospital, London, after testing 420 cerebral-palsied children stated, in 1957, that the incidence of hearing loss which causes a serious handicap to the child was 20 per cent. Connolly, from Manchester University, testing 262 cerebral palsied children, found that 3.1 per cent. had a hearing-loss for pure-tones that exceeded 35 decibels, and 4.2 per cent. a bilateral loss of from 15 to 35 decibels. When monaural losses were included 22.2 per cent. of the children had losses over 15 decibels. The present writer has published an account of a study of 50 cerebral-palsied children with impaired hearing.

In personal communications the principals of a school for the deaf and a school for the partially deaf, in England, have estimated that 10 per cent. of their pupils suffer from some other handicap besides deafness. In the United States, Meyerson, Assistant Professor of Psychology, University of Kansas, has stated that he has examined pupils in schools for the deaf who were feeble-minded or mentally retarded, children who had thyroid and pituitary disorders, brain damage, aphasia, epilepsy, various kinds of cerebral palsy and grave defects of vision. He reports that some of them had severe losses of hearing, but "the hearing impairment was not their greatest problem nor the major contributory source of their behaviour."

To put the matter succinctly we ask, "How can a teacher of the deaf with eight or ten pupils in a class, provide satisfactorily for their needs if one of them has another handicap and is incapable of associating effectively with them in group work?" The teacher's dilemma is all the greater and the risk to satisfactory progress of the group as a whole the more serious, when the additional handicap from which the one child suffers is, for instance, cerebral palsy, with which the teacher has not been trained to deal. This is not an infrequent situation in schools for the deaf and partially deaf. The London County Council and the West Riding Education Committee each have a school for "deaf children with additional handicaps." A unit for deaf-blind children is provided by the National Institute for the Blind and the Wilfred Pickles School for Spastic Children, has recently established a unit for spastic children who are deaf, but there are many children whose deafness is associated with additional handicaps who are pupils in other schools. Streng, Chairman of the Department of Exceptional Education, University of Wisconsin-Milwaukee, and others, described experiments in teaching deaf and hard-of-hearing children with special problems, at the biennial meeting of the Alexander Graham Bell Association in 1958. Besides provision of a stable learning environment, happy to the child personally, Streng, emphasised a need to break down language into simple forms, special help to children in structuring situations, avoidance of complicated materials and preparation by teachers of special charts and, later, books. From our own limited experience of the education of cerebral-palsied children with defective hearing we would say that close co-ordination of modern procedures in the treatment of both handicaps is usually needed.

Children with defects of hearing who have a visual handicap or are mentally retarded

There is likewise a need for specific study of deaf children with defects of vision, who are not pupils in the N.I.B. unit. Then there are the deaf children who are mentally retarded. L. J. Murphy, after giving the Performance Sub-Scale of the Wechsler Intelligence Scale for Children to 300 pupils, aged 6.6 to 10.6 years, in English schools for the deaf, reported that he had found 17 children with Performance Quotients below 75. In his tests of 513 pupils in 36 English, Welsh and Irish schools, aged 12 years, with the Wechsler Adult Performance Scale, K. P. Murphy found 21 cases of P.Q.'s below 75 and 21 cases of P.Q.'s 75-79. There appears to have been no investigation, as yet, of the problems and needs of mentally retarded deaf children.

Special Schools, Special Units and Ordinary Schools

In the present phase of changes in the organisation of education for children with defective hearing much consideration is being given to inter-relation between sociological and linguistic factors. Brereton's four-year study, in Australia, of 90 deaf children, is a rather notable example of this. Their hearing losses (mean 64 decibels with fairly flat audiograms) existed from birth and about 90 to 95 per cent. of them were associated with a history of maternal rubella. Their intelligence quotients, as measured by a test not demanding the use or understanding of language showed a normal distribution between 75 and 111 +. Seventy-four children were born between January and June, 1941. Of the total of 90 children, 31 attended schools for the deaf, 21 special classes attached to normal schools, 15 first attended these special classes and then normal classes, and 19 attended normal classes. Each child was interviewed individually at about 7½, again at about 9½, and finally at about 11½ years of age.

Brereton concluded that " the differences shown in the achievement of the more able and the less able of the children studied was very great. These differences appear to depend upon the children themselves and on their personal history. . . . Even within the limits of the group studied it would be necessary to make plans for one child very different from those made for another." She found that in the cases of children with hearing losses about 65 decibels and scores on the Nebraska Test of Learning Aptitude about 95-99, 22 of whom spent most of the period of observation in a special class, and 22 at a school at which most of the pupils were profoundly deaf, " differences in the midmost scores on all the tests, except knowledge of number, favour the children attending special classes rather than special schools. The deficiencies were not marked but they appeared to become greater between 7½ and 11½." The difference showed most in a more extensive use of spoken language and command of words and written language. Brereton says, " Children in these classes appear to be learning to treat language as something real, and which also can be expressed in writing." She believed that " observation of the dramatic quality of speech in action, of the rhythmic intonation of natural speech and of the sorts of phraseology that occur frequently in everyday life " is of the greatest importance, especially when rhythmic patterns of normal speech are encountered in situations which give meaning to the pattern as a whole."

Our own experience over many years supports Brereton's conclusions. We would agree that the first principle of school placement for children with defective hearing is to base it on ability, linguistic development and attainment, with the possibility of upgrading always available for individual children. We have sound-recordings of the speech of deaf children in the hearing-loss category between 60-65 decibels and 80-85 decibels, and a few of more profoundly deaf children, that illustrate the effects on their linguistic development of much experience of hearing and using the rhythm patterns that are normal to speech. There is continuity of sound in their utterance of phrases—apart from normal stop-gaps of plosive consonants—as contrasted with the sequences of separately-spoken words that tend to characterise the speech of many deaf children. The duration of syllables and words as they occur in phrases and sentences spoken by the auditorily-experienced children is much less than that of children whose speech has no primary basis in hearing.

Hearing Aids, Linguistic Development and School Progress

The children whom Brereton studied were supplied with individual hearing aids but she found great variations in the children's attitudes to their use. Dale, at Manchester, found a similar situation. When he began his study 17 out of 28 pupils in ordinary schools who had been supplied with hearing aids never used them out of school. Few of the 28 used their aids all the time in school and half of them not very often. Dale successfully initiated remedial measures to influence the attitudes of the children, their parents and teachers, towards their deafness and their hearing aids. He was able to improve the extent and the efficiency with which the aids were used. For this kind of work and to meet the special problems that are involved, peripatetic teachers of the deaf are needed, with special aptitudes and training.

Some of the problems are social. As Dale has shown, hearing aids are, as yet, a form of prosthetic device unpopular with children. Neither children nor parents, in many cases, wish to draw attention to their deafness. Parents, children and teachers in ordinary schools need guidance about the possibilities, limitations and management of hearing aids. There is basic information, such as the need for different volume-control settings to give best results in different acoustic conditions, the importance for a hearing-aid user of being as short a distance as possible from a person who is speaking to him, especially in a large room, and the fact that the clarity of utterance and a quality of voice that is good for broadcasting help him much. As John has shown, as a result of his research, and those investigations that he has made in collaboration with Thomas, in our Department, an amount of room-reverberation that passes unnoticed by ordinary listeners can be very adverse to successful use of a hearing aid. Reverberation time should not exceed 0.5 seconds, but this condition is only attainable in schoolrooms as a result of acoustic treatment applied to walls and ceilings. It is practicable in rooms especially selected and sound-treated, at a certain amount of expense, for use by groups of children with impaired hearing. Acoustics in private homes are usually better and, for that reason, it must be urged that when pupils of ordinary schools are supplied with hearing aids, they and their parents should be helped to make their use a success at home, before they are expected to use them in ordinary schoolrooms, that are often very reverberant.

This technological criterion, which in itself involves social factors, goes far to determine the possibility of a deaf or partially deaf child's successful attendance at a normal school. If, before admission, he has achieved a standard of linguistic development, as a result of training elsewhere, that equips him to compete successfully with non-deaf children, he may succeed. Much, in that case, depends on his personality and capacity to meet difficulty and the extent to which his parents and teachers—to some extent his fellow non-deaf pupils—have been helped to understand his position. But if, to a considerable extent, he has yet to learn to understand and use his native language, he becomes greatly dependent on his capacity for auditory discrimination and successful use of a hearing aid. Templin, of the University of Minnesota, has shown that the sound-discrimination ability of non-deaf children of pre-school and school-age shows a consistent increase with age, up to 8 years, with the rate of increase most rapid before the age of 4½ to 5 years. Two factors emerge as regards school placement of a child with defective hearing who has ascertainable capacity to benefit from use of a hearing aid. The first is, " Are acoustic conditions in the school, in which it is proposed to place him, favourable to his progress in speech discrimination? " The second is, " How far will the social conditions give him opportunities of experiencing and using much normally spoken language in real-life situations? " Examples are on record, which show that in special and because objective tests of clarity, dynamics, pronunciation, etc., are hard to come by. Dramatic talent would be another fruitful field for further research.

Mathematical and Scientific Abilities

In the primary school, arithmetical capacity can certainly be distinguished from verbal, though it forms part of the general educational cluster: more pupils are good at both numerical and verbal work, or bad at both, than good at one, bad at the other. Both at this level, and among average or dull adults, it contrasts strongly with the spatial-mechanical cluster. In the secondary school, however, it tends to move across and link more closely with the spatial-mechanical side, less so with the verbal, to give us mathematical, technical and scientific abilities. These all have much in common, and they are more closely related to inductive reasoning and non-verbal intelligence than to the ordinary verbal test. Incidentally, we are probably biasing our secondary school selection to some extent *against* potential grammar school and university scientists by giving such high weight to verbal tests and primary teachers' estimates.

Each branch of science or mathematics develops its own, partially separate, ability; biology provides an obvious example. In arithmetic, the outstanding component is simple mechanical facility with number operations. Problem or reasoning arithmetic is very much more a matter of general intelligence. Geometry is, to some extent, distinguished from arithmetic and algebra by a small but definite spatial ability component.

Memory and Attention

These two faculties are beloved of teachers, but viewed much more critically by psychologists on the grounds that they do not appear to operate as consistent and distinguishable abilities. It is surely obvious that a boy may have an excellent memory for football scores, and a very poor one for spellings and tables; or that a girl who is inattentive in class may concentrate intensively for long periods on her dolls. Nevertheless, there are some who are generally quick at learning, and good at retaining, meaningful material—i.e. material that depends on understanding rather than pure drill. And this capacity, it would seem, is largely identifiable with intelligence + interest. In other words, it is much the same as general educational ability, and not an independent capacity at all. Rote learning, however, *is* rather different, though it is by no means unitary; people do not usually have good or poor memories in general. Not only may it depend on the type of subject matter, but on the structure (e.g. poetry differs from spelling lists), and on the method of assessment (speed of learning, slowness of forgetting, etc.). 'Span' memory, as in the Binet digit and sentence memory items, is different again. Thurstone described, and provided tests for, a rote memory factor; but this refers mainly to tests of associating pairs of words, syllables or shapes, and it has not been found to have any relevance to school learning, except in so far as it involves *g* and verbal ability.

In the past, much has been written on types of imagery, with the implication that those who think or recall mainly in visual, verbal, or other modes, will show differing talents, or will require to be taught differently. It is true that, in answers to questionnaires or in introspective experiments, such differences emerge; but they tend to be inconsistent under different conditions, and no reliable means of assessing them by any objective test can be found. Nor, indeed, does there seem to be any evidence that they possess any practical educational or vocational significance.

'Attention' is equally intractable. Some ingenious tests have been devised which appear to require considerable concentration. For example, lists of mixed letters and numbers are read out:

7 P X 4 9 5 B G 3 L

At the end of each, the testee has to write down the numbers only. Such tests do show some degree of correlation over and above their *g*-content; that is, they yield a distinct group factor; but again there is an absence of evidence that this is the same attentiveness that teachers look for. We would not, of course, deny the existence of differences between children in attention, but it is probable that these derive largely, if not wholly, from differences in:

1. Mental Age.
2. The interest of the child in the particular school lesson.
3. The teacher's capacity to motivate him.
4. His emotional stability, persistence and, possibly, state of health and fatigue.

It will be recognized that Nos. 2, 3 and 4 are much the same as our *X* factor over again.

Reasoning Abilities

A great deal of work has been done in America on varieties of reasoning, planning, grasping relations, etc., particularly at college student level. But the results of different factorists appear to be quite inconsistent, partly because they dislike admitting that all these capacities consist very largely of general intelligence, and that only minor additional group factors are likely to be distinguishable. According to a number of experiments in this country, the most fruitful of these minor types of ability seem to be:

1. Inductive reasoning or abstracting a general principle or pattern from a series of examples, as in the following:

   2 5 7 10 12 15.. What numbers come next?
   ABXCB DEXFE GHXIH.. What letters come next?
   bored roe sweet ewe rides die crate........................ What word comes next?

   The well-known Raven Progressive Matrices Test measures much the same ability (plus a small spatial component), and there is considerable overlapping with arithmetical reasoning. Thus, these tests of *g* with an inductive-reasoning 'flavour' are likely to be particularly useful in predicting scientific aptitudes.

2. Deductive ability, as shown in many reasoning problems, and particularly in logical syllogisms, which depend on the application of a given pattern of premises, e.g.:

   John is sitting on the right of Peter, but he is on the left of Bill. Which is sitting on the right hand, John, Peter or Bill?

   All SEGS are SEMS. Some TETEs are SEGS. What follows? Some, All, No TETS are SEMS.

3. Flexibility in concept-formation, as in the Binet ' similarities ' item:

In what way are snake, cow and sparrow alike?

Alternatively, a number of figures or shapes may be given, for the testee to recognise the common feature. Even more revealing are sets of items which can be classified in two or more ways, for example, blocks which differ in colour, height, cross-section, etc. Some individuals who recognise one mode of classification cannot readily switch to another.

Tests of this kind are employed particularly by clinical psychologists working in mental hospitals, who find certain types of patient (brain-injured, seniles, schizophrenics) more handicapped at these than they are in conventional intelligence tests which involve the application of more routine modes of thinking. R. B. Cattell has suggested distinguishing ' fluid ' from ' crystallized ' ability in adults, the latter being measured by such tests as vocabulary, information and mental arithmetic which depend more on the level of ability reached in the past than on present capacity to tackle new concept-formation. Wechsler's scales of individual tests are similarly classified as tests which ' don't hold ' or ' hold ' with mental deterioration. Maybe the distinction reduces to much the same as the distinction between *g* and verbal-educational ability, or this kind of flexibility may correspond with the originality factor referred to above. But it may be an important quality among normal adolescents as well as abnormal adults; for example, K. Lovell has shown that relatively well-adjusted youths in their 'teens who continue to keep their minds alert through attending a stimulating school or some form of further education, are superior in this type of ability to those who are less adjusted, or who reject intellectual stimulation, the difference *not* being attributable to differences in *g* or educational attainment as such.

In conclusion, we must not give the impression that this picture or map of distinguishable abilities is a complete or final one. As already pointed out, there are many possible ways of classifying or sub-classifying; and many other important mental differences which we recognise in daily life, in schools or at work, may have been omitted because they are more difficult to assess, and because there is little experimental evidence either of their consistency or of their importance in guidance and selection. Instead of criticizing the list because it omits, say, imagination, wisdom and judgment, intuition, rationality, orientation, or a host of other possibilities, it would be more useful if readers would help to provide such evidence.

References

Burt, C. " The Education of the Young Adolescent: The Psychological Implications of the Norwood Report." *Brit. J. Educ. Psychol.*, XIII, 126-140, 1943.

Burt, C. " The Structure of the Mind: A Review of the Results of Factor Analysis." *Brit. J. Educ. Psychol.*, XIX, 100-111, 176-199, 1949.

Dale, R. R. *From School to University*. London: Routledge and Kegan Paul, 1954.

Daniels, J. C. and Diack, H. *The Standard Reading Tests*. London: Chatto and Windus, 1958.

Fleishman, E. A. and Hempel, W. E. " Factorial Analysis of Complex Psychomotor Performances and Related Skills." *J. Appl. Psychol.*, XL, 96-104, 1956.

Fruchter, B. *Introduction to Factor Analysis*. New York: Van Nostrand, 1954.

Guilford, J. P. " Three Faces of Intellect." *Amer. Psychologist*, XIV, 469-479, 1959.

Lovell, K. " Intellectual Deterioration in Adolescents and Young Adults." *Brit. J. Psychol.*, XLVI, 199-210, 1955.

Vernon, P. E. " A New Look at Intelligence Testing." *Educ. Res.*, I, 3-12, 1959.

Vernon, P. E. *The Structure of Human Abilities* (2nd edit.). London: Methuen, 1960.

Wing, H. D. " Tests of Musical Ability and Appreciation." *Brit. J. Psychol. Monogr. Suppl.*, No. 27, 1948.

SOCIAL LEARNING AND ITS MEASUREMENT

by M. L. Kellmer Pringle
(*Department of Child Study, University of Birmingham*)

Introduction

THE adult who is socially mature is not hard to recognise. He has achieved independence from his parents, he has found security in friendships among his contemporaries, he has made an adjustment to accepted customs and conventions, he has settled upon a stable sexual pattern, most commonly in monogomous marriage, and he has found work that satisfies him. With regard to the child, we implicitly accept that there are some developmental standards or norms for social maturity just as there are for physical, emotional or intellectual maturity. Thus, whether as parents or teachers, we say to the six-year-old " you are old enough to come to school by yourself," or to the eight-year-old, " you ought to be able to tell the time," or to the ten-year-old, " most boys of your age run errands for their mother." Whenever we say to a child " you are old enough to do this for yourself," we give recognition to the fact that increasing responsibilities and independence accompany social growth. Awareness of the " social ages of man " is as old as literature and as new as science. In *As You Like It*, Shakespeare poetically describes man's seven ages, while during this century many attempts have been made at more formal definitions of the successive stages of social growth, from the utter dependence of babyhood to the independence of the adult.

In recent years there has been increasing emphasis on the central part which social development plays in the development of the whole personality. One writer has even defined personality as " social effectiveness." Anderson & Anderson point out that in all recorded history man has struggled with two problems of social behaviour. The first is how to be an individual; how to have ideas of one's own; how to learn from one's own experience and to develop judgment based upon this experience; how to think for oneself; how to grow and develop psychologically to one's optimum. But in trying " to be oneself," one frequently makes life inconvenient for others. This is how the second problem of social behaviour arises. It lies in the struggle to reconcile individual differences in motives, values and actions. Though individuals are different, they must exercise these differences in such a way as to achieve the greatest possible harmony in social living. This second problem of achieving harmony is thus inextricably linked with the first one of individual freedom.

It can be argued that the social development of the child is basic to these twin problems of individual differences or differentiation on the one hand, and harmony or integration on the other. These concepts of differentiation and integration have been used by Toynbee in the interpretation of " The Growths of Civilisations," to account for the successful development as well as for the arrested growth of civilisations. As he sees it the growth of civilisation is a process of differentiation and integration, the most essential criterion being an increase in self-determination.

Thus, almost every society lays down some standards defining the rights and duties of individuals; without them there could be no order or stability. One aspect of growing up involves the process of increasing conformity to the accepted cultural norm of the adult world. It is perhaps debateable to what extent the desire and struggle for individual freedom and optimum personal development is learned or innate; there is little doubt that harmony and conformity must be learned, indeed they present perhaps the very essence of social learning.

The concept of social maturity

The general concept of social maturity and the more specific one of social competence, are crucial for psychological study. Even more than on mental level or educational achievement, satisfactory emotional adjustment of a human being depends upon the adequacy with which he meets the growth tasks set by the culture and by the group in which he finds himself. Educational attainment can itself be viewed as a social task, at least for school children, though it is neither the only nor even the most important one. In a rough and ready way we compare the social growth of children, when, for example, we say that " Mary is old for her age " or " John seems socially immature." A more objective analysis and evaluation of the way in which a boy or girl is conforming to the social growth tasks set by his culture and his society would be of fundamental importance in the class room, the Juvenile Court, the workshop and the community at large. A promising empirical beginning might be made in the field of " social maturity " or " social competence " in terms of sampling the social achievements demanded by a particular society. A thorough analysis of causative factors can at present be approached only subjectively, inferentially and imperfectly. Attempts at measurement should clear the way for a closer study of the extent to which environmental modifications can influence social development.

At once we are beset with problems of definition. Terms such as " socialisation," " social maturity," " anti-social traits," are frequently found in educational and psychological discussion: public schools pride themselves on giving " social training "; delinquents are said to be " socially immature "; how pre-school children " learn social participation " has been studied in detail. But still definition is lacking. No doubt, one reason for this is that standards of social behaviour differ not only from one society to another, but even from one social class to another in the same society. Anthropologists, notably Benedict and Mead, have shown how a form of social behaviour, despised in one culture, may be prized in another. Since cultural norms vary widely from society to society, meaningful generalisations cannot readily be made. However, despite these difficulties, some attempt at definition must be made to clarify the concept of social maturity. The following tentative definition has been suggested by the author elsewhere:

> Social maturity is manifested by the extent to which an individual is able and willing to coform to the customs, habits and standards of behaviour prevailing

> in the society in which he lives; by the degree to which he is able to do so independently of direction and guidance; and by the extent to which he participates constructively in the affairs and conduct of his community.

Of course, this definition is mainly descriptive and begs fundamental questions both as to causes and as to their interaction. Moreover, it could be argued that acceptance of and conformity to the prevailing customs, habits and standards may not be desirable if the particular society happens to be over-materialistic, corrupt or degenerate. However, such argument would lead into moral and philosophical realms outside the scope of this discussion.

Determinants of Social Maturity

Genetic and hereditary factors. An individual's ability to conform to the standards laid down by his society depends upon genetic, hereditary, maturational and environmental factors. It is probably safe to assume that genetically children are equipped for social participation and social adaptation. Hereditary components may also influence the development of social maturity. This is a possible hypothesis in cases of delayed social maturation such as is found in some problem children, juvenile delinquents and adult criminals. Their inability to conform to standards of conduct expected by society may spring from some hereditary defect or weakness, limiting their capacity for attaining social maturity. This view is advanced by Doll, who suggests that social maturity is distributed in a way similar to that of intelligence. He investigated a series of families and printed genealogical trees for four generations, showing that in some families social maturity never reached a normal level, while in others it was always above average. In Doll's opinion, this is evidence that heredity plays a part in the development of social maturity and that in some cases social defect may be inherited. At present this theory seems rather speculative; it would be safer to assume that there may be disturbing or inhibiting factors in the emotional or intellectual life of the child or adult which account for inadequate social learning and a lower than expected level of social conformity.

Maturation. " Maturation " refers to those changes in bodily or mental structure which mainly come about through growth. The connection between maturational factors on the one hand, and genetic and hereditary factors on the other, is, of course, close, since maturational rates and final levels achieved depend largely on these latter factors. At the same time, in all forms of learning certain growth stages have to be reached before specific functions can be acquired. In the development of social competence, as in educational progress, certain levels of maturation are pre-requisites though not necessarily causative. For example, by fostering physical development, we can assure that a child is not prevented or inhibited from learning social participation in games at the appropriate age. But this by itself will not ensure that he will be willing to do so.

Intellectual growth is another pre-requisite to social development. But maturation of inborn, intellectual ability is not the same as maturity of mind, which depends to a greater extent on social and emotional maturation. Thus, the development of physical and intellectual readiness does not ensure either willingness or ability to adapt socially. This depends largely upon maturation in the emotional life. Indeed, some writers, such as Bowley, consider that from the very first stage of babyhood, social development is closely related to emotional development, proceeding from the intimate family circle outwards to ever-widening social spheres. Here we can see the link between environmental factors and learning ability since without such ability the child will fail to appreciate his developing role and responsibilities as a member of the family and later of other social groups.

Environmental factors and social learning. Social learning begins within the family, and the first social contact is that between mother and child. In feeding, the first step is taken from a purely physiological need to an acquired habit, which will become increasingly " socialised," i.e. from sucking the nipple or teat, to the elaborate etiquette governing " feeding habits " at a state banquet. In the dependency relationship of the child to the mother, later to the father, and then to other people, is to be seen the primary socialising pattern, the task of learning to become a human being. The baby is born only with the potentiality to become a person and has to be taught to become human. That the emotional and social attributes of personality are a function of living in a human society, is demonstrated clearly by two phenomena: firstly, by the distortion in the development of children born without the necessary sense organs to perceive, communicate and thus interact with their environment, such as the deaf-blind; of these, Helen Keller is the most famous example because she is one of the very few who have successfully broken through the immense barrier to social learning imposed by this dual handicap. Secondly, children who by some chance or mishap have been isolated from normal human contact during early infancy, show a complete lack of those characteristics which we regard as specifically human, i.e. speech, emotional control and social skills (for example, the case of Anna described by Kingsley Davis).

Within the family circle, the child is introduced to a world that has regularity and predictability. Maternal approval and disapproval are the main devices for training and teaching the very young. Mothering, to begin with, ensures the sheer survival of the baby but the complete indulgence of all his wants is changed gradually into a series of regulatory pressures or demands. By withholding or granting adult approval and co-operation, the parent has constantly at his command a device for selectively rewarding (by responding to) those new, more mature responses which make their appearance. Without the capacity for learning, the helpless infant could not become a socially mature adult; the group, in the first instance the family, has the important function of transmitting the social heritage to the maturing child. As he grows up, an increasing number of groups continue this task: the adults and children in the neighbourhood, his classmates at school, members of any club he may belong to, and later his workmates, as well as the various mass media of communication (such as the press, radio, T.V. and the cinema) increasingly familiarise him with the customs and standards of his culture.

How important these group influences are, is shown not only by studies of different cultures but also, and perhaps as strikingly, by differences which exist between social groups even in our own culture. The farm labourer's son will acquire skills which the surgeon's son of the same age does not need and may even despise. Their speech, standard of personal hygiene, spare time occupations and interests, will all reflect social differences in their home and neighbourhood setting. Other examples, within the experiences of many teachers are neglected children in slum areas who are a-social, if not anti-social, because throughout their lives they have lacked adequate social training.

The social learning of deviant children. The study of exceptional children throws into relief the fact that the relationships so far discussed, are more subtle and complex than at first appears. It seems possible, for example, that an unusually high level of intellectual maturity may prevent or make more difficult a commensurate degree of social maturity. Terman and Burke point out that precocity unavoidably complicates the problem of social adjustment. For example, the ten-year-old with an I.Q. of 150 can hardly be expected to function socially at the fifteen-year-old level. Yet his high ability will inevitably mark him off to some extent from his less gifted contemporaries, while their social mores may well strike him as unacceptably childish. Thus, socially, he may constitute as much of a problem as the exceptionally dull child. The difficulties of the latter lie in the fact that severely sub-normal intelligence limits the pace and range of learning. Thus, it will also hinder learning in social situations. Consequently, the very slow learning child finds himself at a disadvantage among his contemporaries not merely educationally but socially as well, since he has not yet mastered the social conventions of his peers.

Nevertheless, it is known that certain types of mentally handicapped children, such as mongols, achieve a comparatively high degree of social adaptation; many learn to dress themselves, to help with simple household tasks, are sociable and easy to manage. However, this level of social conformity is reached mainly through their marked imitativeness. Failure is conspicuous in the second and third categories of the definition given above: throughout their lives, most mongols require guidance and remain unable to participate constructively in the affairs of their community.

Physically handicapped children will also be inevitably circumscribed to a greater or lesser degree depending on the nature and severity of their disability. For example, the severely cerebral palsied are unable to conform even outwardly with regard to such comparatively simple skills as eating habits. Even if they possess the necessary intellectual equipment for attaining full social maturity, physical limitations deny them such achievement. If he attends a special school the handicapped child finds himself in a sheltered community designed to meet his needs. There he can feel safe, accepted and not so very much different from his fellows. But eventually he must once again face the outside world unless he is to spend his life in a residential institution of some kind. Perhaps the basic educational aim with handicapped pupils should be to prepare them to live with some measure of social usefulness and a sense of social participation. An example of how this can be achieved can be seen at Condover Hall School for blind, educationally sub-normal children. Because normality and conformity are highly prized in our society, handicapped children are faced with a severe problem of social and emotional adjustment. Yet many handicapped adults, because of outstanding emotional stability, perseverance and determination, achieve an unexpected measure of social adaptation despite their disabilities.

Special problems of social adaptation have to be met by another group, namely, those who spend the major part of their childhood in residential care. It is not easy in a large children's home to provide the same range of opportunities, both of a formal and an informal kind, which give rise to social learning in the everyday lives of children living with their own families. This is well-recognised nowadays by those concerned with children in care, but practical achievement is made extremely difficult chiefly because of an acute shortage of suitable staff.

Lastly, the maladjusted child is often characterised by marked emotional immaturity and this goes frequently hand in hand with inadequate social learning and a low level of social conformity. Though intelligent and with apparently sufficient opportunities for social learning, many neurotic children and adults show failures in social adaptation, such as over-dependence, uncontrolled aggressiveness, an inability to mix, and so on. On the other hand, precocious emotional development—often under the impact of stress at home or conflict in the child—may similarly, though perhaps more rarely, impede the development of adequate social adaptation.

Social Maturity—A Measurable Entity?

Any attempt to measure social maturity raises two questions: firstly, is there a real progression in the level of social maturity independent of intelligence? Secondly, if the answer to this is affirmative, are there sufficient tasks, at different maturational levels, to make possible the construction of a scale extending from birth to maturity? With increasing age children are faced with an ever-increasing complexity of demands and expectations, and this is clearly shown by numerous developmental studies. Though none of these aim directly at a scale measuring general development, most of them provide an outline of progressive general development and suggest norms in the physical and intellectual, as well as in the social sphere.

During the pre-school years comparatively simple and uniform demands are made. During the middle years of childhood, from five to eleven years, most children are exposed to more or less uniform social pressure, though some variation is beginning to show. The start of compulsory schooling and the transition to the Junior School two years later, present focal points for new social adjustments. Educational difficulties also become apparent during this stage, particularly in reading, and failure may have far-reaching effects upon social and emotional development. From the age of eleven years onwards, there is increasingly less uniformity of pressure and expectation. In addition to differences in educational environment, there is during the 'teens an increased widening of abilities, interests and responsibilities; this carries with it a greater variety (and thus choice) of tasks as well as an increased chance of failure. All these changing conditions are likely to give rise to more marked differences in social development.

It seems, therefore, that up to the age of about eleven years there is sufficient uniformity of pressure and expectation to make possible the construction of norms of social development which are largely independent of social group and applicable at least within this country. Thereafter the sampling may well have to be wider and the alternatives more numerous to allow for increasing differences in educational and other environmental opportunities. For the purposes of measurement it would be necessary to sub-divide the concept of social maturity into various aspects such as social competence, social knowledge, independence, foresight and so on. Of these, social competence is likely to be most readily measured. By this term is meant the ability to carry out social tasks normally achieved by children of a given age as there are some fields in which all children are expected to reach eventually certain minimum standards. Examples of such fields are habits of eating, cleanliness, dressing, the attainment of personal and economic independence.

Thus, social maturity may be assessed by the competence which an individual shows in performing " social tasks " at various levels. Such social competence might be regarded as one aspect of social maturity. Clearly, it is an important one and of the same order as acquiring educational skills. Just as reading is an artefact of the environment, so is the form in which social competence finds expression. It is a learned response and must be assessed both in terms of capacity to respond and of actual level reached. Educational attainment gives an indication of how a child is meeting the relatively controlled and structured demands of school. Social competence will indicate the extent to which a child is meeting the less controlled and structured demands of the ever-widening social group with which increasing age brings him into contact.

So far, few attempts have been made at objective measurement. Various methods used in studies of child development are suggestive, such as systematic observations, the case history or clinical approach, standard situation tests, ratings and developmental schedules. These, however, yield qualitative rather than quantitative data. Moreover, most investigations have concentrated upon the pre-school years. What seems to be needed is a scale or measuring instrument which permits quantitative comparisons in social competence from birth to adulthood and which allows such measurement in a brief period of time.

Doll's *Vineland Social Maturity Scale* is a first attempt at measurement of this kind. In spite of Vernon's view that it merits " very thorough examination," it has received only limited attention in this country. Originally the scale was devised to measure the social abilities of children suspected of mental deficiency. It is interesting to note in passing that when Binet, in 1901, devised his individual scale for testing intelligence he aimed at solving a similar practical problem, namely, the setting up of objective criteria for determining intellectual defect in pupils of the Paris schools. Doll's scale is based on an interview, with the subject himself or with someone thoroughly familiar with the child's habitual behaviour. Simple, concrete information is asked for regarding the child's responses in a variety of social situations occurring in everyday life. There is one major weakness in the construction of the scale to which Doll himself draws attention: at the lower age ranges, behaviour is sampled fully and extensively; but later years, especially adolescence and adulthood, are inadequately covered. This is probably due to the fact that with increasing age it becomes progressively more difficult to eliminate the influence of such variables as sex, education, opportunity, intelligence and motivation.

Research Results

In what follows the voluminous American work with the Vineland Scale will be very briefly reviewed; then studies reported in this country will be discussed in greater detail.

Growth rates and developmental periods. There are several studies in each of these fields. Annual re-examinations were carried out by Doll both of normal and mentally handicapped children. There appeared to be marked individual differences in rates of growth in social competence; usually growth after the age of twenty-five years was negligible which confirmed the author in his view that this age is the normative average ceiling. With the mentally handicapped, longitudinal studies using the scale were found to be of value in confirming early diagnosis and in giving guidance to parents and institution staffs. A further validation of the scale has been found in the study of twins, using identical and non-identical twins as well as subjects of normal and sub-normal intelligence.

In various studies concerning pre-school children the scale has been found practicable and helpful. The results were used in the treatment of parent-child relations, in the analysis of infant behaviour problems and in parent education generally.

Socio-economic level. Evidence here is somewhat conflicting. According to most studies, differences in environment seem to play a relatively minor part provided the subjects belong to the same culture. In one study, however, significant differences in social competence were found between children who come respectively from rural and urban areas. At the age of five years the city children were more competent socially, while at the age of ten years the position was reversed and the rural children were superior in this respect.

For mentally sub-normal groups the correlation between parental social standing and the child's level of social competence is in fact negative. This reflects probably not so much environmental differences as the well-known tendency for very low-grade mentally handicapped children to come from superior families. Such families tend to continue the period of dependence for sub-normal children longer than is usual in culturally inferior homes.

Deprived, Maladjusted and Delinquent Children. Field studies of special groups indicate the utility of the instrument for practical as well as theoretical purposes. Investigations of children deprived of normal home life and living in residential institutions have aimed at assessing the psychological effects of such deprivation, especially for very young children. Attempts have also been made to find suitable control groups by matching institutionalised children with others placed in small foster homes.

In some long-term studies, notably the classical ones by Goldfarb, it also proved possible to observe the social development of children who were placed in foster homes following a considerable period in a residential home. It was found that initially the children in institutions seemed to be as well, if not better developed socially than those in the foster homes; for those children who were then fostered out, the situation began to change: their social competence declined whereas the group living in foster homes all the time continued to progress normally. This phenomenon suggests that when the support of the institution routine was removed, the thin shell of social maturity collapsed; the children regressed then to more infantile and dependent behaviour, probably because of the early lack of personal affection.

Studies of maladjusted children of varying levels of intelligence and with a wide variety of emotional problems show that treatment can be made more effective by having available an assessment of the children's level of social competence. At the same time it was found that neither social age nor the relationship between intelligence and social quotient provide a basis for making a prognosis regarding the type of problem behaviour likely to be shown by a particular maladjusted child.

Applying the scale to juvenile delinquents, Doll and his collaborators found that the typical delinquent is socially inadequate and irresponsible. Marked retardation in social competence was found in comparison with age and level of intelligence.

Handicapped Children. Studies of deaf, blind, epileptic and physically handicapped children have suggested the ways in which a particular handicap affects the development of social competence. In addition, through the retrospective use of the scale, records may be obtained to plot the course of improvement or deterioration in a child's social learning. Cumulative growth rates indicate the general trend of progress or retrogression.

Lastly, the results of the scale have been valuable in deciding upon the most appropriate placement for a child; whether, for example, he will do best living at home and being given work assignments there, or whether he can daily go out to a protected workshop or whether institutional life would best meet his needs.

The greatest use of the scale in the United States has undoubtedly been with mentally handicapped children and adults. Indeed, Doll believes social competence levels can be used as differential criteria for conditions of slight, severe and extremely severe conditions of mental sub-normality. Thus, the scale is of great practical value not only in deciding on the most suitable education and placement of the mentally handicapped, but also in planning suitable training programmes and evaluating their long-term effects. In fact, it appears that social age provides a more effective basis of classification for purposes of education, training or care than does mental age. It is claimed that the scale has demonstrated its ability to differentiate between true mental defectives who are socially inadequate and those who are merely of sub-normal intellect but quite competent in managing their personal and social lives.

Studies in this country

Normal children. To assess the validity of the Vineland Scale and its applicability in this country, an intensive study of 250 cases was undertaken by Kellmer Pringle. Among the main variables were intelligence, educational level, personal adjustment and parental socio-economic status. The age range of the children was from six to eight years. Each child was individually interviewed and for forty children a home visit was also paid. To investigate the influence of the socio-economic and cultural background on social development, the children were chosen from four areas differing widely in this respect (namely, a rural, a metropolitan, a working class and a professional area). A very detailed study of those cases which showed a marked discrepancy between individually assessed intelligence and social competence was also undertaken. No sex differences were found nor were there any differences in social competence between the children from the four social areas. Yet there were significant differences both in intelligence and reading attainment. It seems that at this age level at any rate, diverse environments offer those opportunities that lead to an average development of social competence. Alternatively, at this comparatively early age social expectations may not, as yet, be sufficiently differentiated from area to area and class to class, to result in measurably different social quotients. Marked advancement or retardation in social competence compared with mental level, was found to be associated with some emotional disturbance.

Maladjusted and Delinquent Children. To illustrate the usefulness of the Scale' Bodman applied it to one hundred problem children referred for psychiatric advice. He found that despite unfavourable environments, many children had normal social quotients, but also that in some cases excessive social pressure had often resulted in undesirable behaviour patterns. The data suggested that there is less variability for social than for intelligence quotients.

In the previously mentioned study by Kellmer Pringle, a comparison was made between 200 normal children and 50 cases referred to a Child Guidance Clinic because of problem behaviour. The social maturity level of the problem group was found to be significantly lower than that of the normal sample. This suggests that emotional disturbance has an inhibiting or retarding influence on social growth. But there was also evidence that a precociously high level of social competence goes hand in hand with emotional difficulties. In fact, it looks as if the child who, compared with his mental level, is markedly advanced or retarded in social competence, is likely to be emotionally disturbed. It was clear that the home influence was one of the most important causative factors in the promotion of an optimum level of social competence.

Dunsdon used the scale for studying all the juvenile delinquents who were brought before the court in one particular area during a period of five years. In every case showing a low level of social competence she found also a lower than expected level of achievement at school or at work. However, a large proportion of delinquents over 16 years of age showed comparative acceleration in social development. Dunsdon concluded that in these cases the attempt at shouldering social responsibilities without commensurate intellectual comprehension was one of the major causes of the delinquent breakdown.

Deprived Children. A study of the social adaptation of institution children was made by Bodmah, McKinlay and Sykes. They matched fifty-one children who had spent at least three years living in a residential Home with a control group brought up in their own families, and studied a number of variables, including the children's family history and their social activities. The institution children were found to be less mature socially than the control group. There was also a much higher incidence of parental instability or of mental defect in the parents of the institution group. From this the investigators concluded that social maturation was influenced at least as much by constitutional as by environmental factors.

In a study of the development and achievement of 188 deprived children living in institutional care, Kellmer Pringle and Bossio found that social competence was the only aspect in which the development of the deprived equalled that of ordinary children. This was the case for both sexes and for the three age groups making up the sample (namely, 8, 11 and 14-year-olds). These results confirmed other investigations which suggested that institutional routine involves unduly high demands for social independence and thus tends to produce precocious but rather precarious social development.

In a comparative study of a very stable and a severely maladjusted group of children in care, Kellmer Pringle and Bossio found the latter group to be rather less mature socially. In addition the maladjusted group tended to show from time to time regressive tendencies in social behaviour both in the Home and at school.

Conclusions

Attempts to measure the social aspects of human growth are as yet only in the beginning stages and our knowledge of norms of social development is still inadequate. Doll's *Vineland Social Maturity Scale* is an instrument which makes measurement possible in at least one area. In a field where concepts are misty and ill-defined, it must be regarded as a valuable first approach towards clarification of theoretical notions and towards the practical possibility of quantification. At the same time it need be stressed that the scale should still be regarded as experimental. It was devised by a clinician for the use of clinicians; its author claims that only the clinically-trained examiner can make the best use of it and avoid some of the pitfalls open before the naive or perhaps emotionally involved investigator.

There is no intrinsic reason why such a scale should not be used by teachers, probation officers, youth employment officers and the like. Before such a wider use can be advocated in this country, a number of things remain to be done. Chief among them are the expansion of the scale by increasing the number of items in each year group after the present ninth year; the standardisation of this enlarged version of the scale in England; the preparation of a manual which gives a much more detailed analysis of the behaviour required for each item than appears in the present manual so as to enable qualified teachers and social workers to use the scale successfully. At present it is perhaps of greatest value with deviant children in whose cases social competence is an issue of practical importance. Additional insight can be gained into the difficulties and needs of the mentally handicapped, the emotionally maladjusted and the delinquent child.

Whether the level of social competence can be raised for some or all children by deliberate training; whether acceleration and retardation in social development has different meaning and significance at different ages; whether it might be possible to establish borderlines for " social backwardness " and " social defect "; these and many other questions must wait upon the results of further research. But the solution of these problems may well be as important for our knowledge of social development as the experimental work of the last three decades has been for our knowledge of the maturation of intellectual growth.

Bibliography

This is a list of the material consulted and summarised in the preceding paper; items providing a select initial bibliography for further reading are marked with one asterisk (*); more difficult and specialised items with two asterisks (**).

ALLPORT, G. E. *Personality*. Constable & Co., London, 1949.

**ANDERSON, H. H. and ANDERSON, G. L. " Social Development," Chapter 19, in the *Manual of Child Psychology*, ed. L. Carmichael. John Wiley & Sons, 1954.

BODMAN, F. " Social Maturity Test." *J. Ment. Science*, Vol. 92, 1946.

BODMAN, F., McKINLEY, M. and SYKES, K. " The Social Adaptation of Institution Children." *The Lancet*, Vol. 1, 1950.

*BOWLEY, A. H. *The Natural Development of the Child*. E. & S. Livingstone, 1944.

BRACKEN, HELMUT VON. 1943. " Investigation on twins concerning the development of self-sufficiency in children." (Trans. by Marianne H. Wasson). *Training School Bulletin*, 39, 177-188, 198-208.

BRADWAY, KATHERINE P. 1937c. " The social competence of deaf children." *American Annals of the Deaf*, 82, 122-140.

BRADWAY, KATHERINE P. 1937d. " Social competence of exceptional children: I. Measurements of social competence; II. The mentally subnormal; III. The deaf, the blind, and the crippled." *Journal of Exceptional Children*, 4, 1-8, 38-42, 64-69.

Bradway, Katherine P. 1938. " Social competence of grade school children." *Journal of Experimental Education*, 6, 326-331.

Bridges, K. *Social and Emotional Development of the Pre-school Child*. Kegan Paul, 1931.

*Buhler, C. *From Birth to Maturity*. Kegan Paul, Trench, Trubner & Co., 1947.

Capwell, Dora F. 1945. " Personality patterns of adolescent girls: II. Delinquents and non-delinquents." *Journal of Applied Psychology*, 29, 289-297.

Ceres, C. Mildred. 1946. " A study of the Vineland Social Maturity Scale applied to young normal children." *Unpublished M.A. thesis*, State University of Iowa.

Davis, K. " Extreme Social Isolation of a Child." *Am. J. Soc.*, Vol. 45, 1940; and Vol. 52, 1947.

Deacon, Kathryn F. 1942. " An experiment in the training of low-grade defectives." *American Journal of Mental Deficiency*, 47, 195-202.

Doll, E. A. " The inheritance of social competence." *J. of Heredity*, Vol. 128, 1937.

*Doll, E. A. " Measurement of Social Competence." Educ. Test Bureau, Educ. Publishers, Inc., 1953.

Doll, E. A. 1939b. " Growth studies in social competence." *Proceedings of the American Association on Mental Deficiency*, 44, 90-96.

Doll, E. A. 1940a. " Annotated bibliography on the Vineland Social Maturity Scale." *Journal of Consulting Psychology*, 4, 123-132.

Doll, E. A. 1946. " The maturational basis of education." *A Crianza P Portuguesa*, 5, 195-209.

Doll, E. A. and James J. Brooks. 1942. " The therapeutic uses of the Vineland Social Maturity Scale in its application to adult prisoners." *Journal of Criminal Psychopathology*, 3, 347-358.

Doll, E. A. and Kathryn A. Fitch. 1939. " Social competence of juvenile delinquents." *Journal of Criminal Law and Criminology*, 30, 52-67.

Doll, E. A. & S. Geraldine Longwell, 1937. " Social competence of the feeble-minded under extra-institutional care." *Psychiatric Quarterly*, 11, 450-464.

Doll, E. A, and B. Elizabeth McKay, 1937. " The social competence of special class children." *Journal of Educational Research*, 31, 90-106.

**Dunsdon, M. I. " Notes on the Intellectual and Social capacities of a group of young delinquents." *Brit. J. of Psych.*, Vol. 38, 1947.

Gambaro, Providence K. 1944. " Analysis of Vineland Social Maturity Scale." *American Journal of Mental Deficiency*, 48, 359-363.

Gesell, A. *The First Five Years of Life*. Methuen & Co., n.d.

Gesell, A. and Ilg, F. L. *The Child from Five to Ten*. Hamish Hamilton 1946.

**Goldfarb, William. 1943. " The effects of early institutional care on adolescent personality." *Journal of Experimental Education*, 12, 106-129.

**Goldfarb, William. 1945. " Effects of psychological deprivation in infancy and subsequent stimulation." *American Journal of Psychiatry*, 102, 18-33.

Goodman, Alice W. 1940. " Social competence of institutionalised young female epileptics." *American Journal of Mental Deficiency*, 45, 219-227.

Goodman, Alice W. 1941. " Deviation of social competence in selected epileptics." *American Journal of Orthopsychiatry*, 11, 104-110.

Gottsegen, M. C. " The use of the Vineland Social Maturity Scale in the planning of an educational programme for non-institutionalized low-grade mentally deficient children." *Dissertation Abstracts*, Vol. 17, 1957.

Isaacs, S. *Social Development in Young Children*. Routledge, 1933.

Kelly, Elizabeth M. 1941. " A program to develop social maturity in the orthopedic child." *Journal of Exceptional Children*, 8, 75-79.

Kluckhohn, C. and Murray, H. A. *Personality in Nature, Society and Culture*. Jonathan Cape, London, 1949.

Levy, D. *Maternal Over-protection*. Columbia Univ. Press, N.Y., 1943.

Lurie, Louis A., *et al.* 1941. " Intelligence quotient and social quotient." *American Journal of Orthopsychiatry*, 11, 111-117.

Lurie, Louis A., Florence M. Rosenthal and Louisa C. Outcalt. 1942. " Diagnostic and prognostic significance of the difference between the intelligence quotient and the social quotient." *American Journal of Orthopsychiatry*, 12, 104-114.

Maslow, A. H. *Motivation and Personality*. Harper, N. W., 1954.

Maxfield, K. E. and Buchholz, S. " A Social Maturity Scale for Blind, pre-school Children."

Maxfield, K. E. and Harriet A. Fjeld. 1942. " The social maturity of the visually handicapped pre-school child." *Child development*, 13, 1-27.

McIntire, J. Thomas. 1942a. " Babbitt Hospital: An experiment in the treatment of cerebral palsied children." *Training School Bulletin*, 39, 158-163.

McIntire, J. Thomas. 1942b. " Cerebral palsy treatment experiment." *Crippled Child*, 20, 94-96.

Messenger, Virginia M. 1940. " A longitudinal comparative study of nursery school and non-nursery school children." *Unpublished Ph.D. thesis*, State University of Iowa.

Morales, Noemi. 1942. " The social competence of idiots." *American Journal of Mental Deficiency*, 47, 209-214.

Muench, George A. 1944. " A follow up of mental defectives after eighteen years." *Journal of Abnormal and Social Psychology*, 39, 407-418.

*Myers, S. O. " Condover Hall School for the Blind." *Ed. Review*, Vol. I, 1948.

MYKLEBUST, HELMER R. and EDWARD M. L. BURCHARD. 1945. "A study of the effects of congenital and adventitious deafness on the intelligence, personality and social maturity of school children." *Journal of Educational Psychology*, 36, 321-343.

PEAR, T. H. *The Maturing Mind*. Nelson, n.d.

POWELL, LEE and H. R. LASLETT. 1941. "A survey of the social development of the 10th, 11th and 12th grade pupils in a small high school." *Journal of Experimental Education*, 9, 361-363.

PRINGLE, M. L. KELLMER. "Social Maturity and Social Competence." *Educ. Review*, Vol. 3, Nos. 2 and 3, 1951.

**PRINGLE, M. L. KELLMER, and BOSSIO, V. "A Study of Deprived Children." *Vita Humana*, Vol. I, Nos. 2 and 4 1958.

PRINGLE, M. L. KELLMER, and BOSSIO, V. "Early. prolonged separation and emotional maladjustment." *Journal of Child Psychology and Psychiatry*, I, 37-49, 1960.

SPRINGER, N. NORTON. 1941. "The social competence of adolescent delinquents: a comparative study of white and Negro first offenders and recidivists." *Journal of Social Psychology*, 14, 337-348.

TOYNBEE, A. J. *A Study of History*. Vol. III: *The Growth of Cilivisations*. Oxford University Press, London, 1939.

TROUP, EVELYN and OLIVE P. LESTER. 1942. "The social competence of identical twins." *Journal of Genetic Psychology*, 60, 167-175.

VERNON, P. E. "The Assessment of Psychological qualities by Verbal Methods. Med. Council, Industrial and Health Research Board, 1938.

WATTS, FREDERICK P. 1941. "A comparative clinical study of delinquent and non-delinquent Negro boys." *Journal of Negro Education*, 10, 190-207.

WERNER, E. "Milieu Differences in Social Competence." *J. Genetic Psych.*, Vol. 91, 1957.

WHITCOMB, MARIAN A. 1945. "A comparison of social and intellectual levels of 100 high-grade adult mental defectives." *American Journal of Mental Deficiency*, 50, 257-262.

WILE, IRA S. and ROSE M. DAVIS. 1939. "Behaviour differentials of children with I.Q.'s 120 and above and I.Q.'s 79 and below, with some reference to socio-economic status." *American Journal of Orthopsychiatry*, 9, 529-539.

WILSON, MARGARET T. 1941a. "Mental ages and social ages of normal and defective twins and siblings." *American Journal of Mental Deficiency*, 45, 374-379.

WILSON, MARGARET T. 1941b. "Social competence of normal and defective twins." *American Journal of Orthopsychiatry*, 11, 300-303.

The Education of Exceptional Children—III

HIGHLY INTELLIGENT CHILDREN

Part II—The Education of the Gifted

W. D. WALL

The Talented

THE education of markedly talented or gifted children who may or may not be strikingly able in a general educational sense, presents a number of problems and the nature of these is likely to change from childhood to adolescence and from adolescence to young adulthood. Very specific gifts of marked degree—such as mathematical or musical ability, the writing of poetry, marked skill in drawing or painting—may declare themselves early and in a pronounced fashion. Sometimes such precocity is, indeed, the sign of a permanent bent and the foundation of a future career. However, it is difficult to be sure; and the special talent may in fact be a somewhat one-sided manifestation of high general ability brought about by an immediate but possibly transient interest; or it may be due to identification with the interests of a loved adult; or it may in fact be a reaction, as when an able child feels that he cannot compete with a musical family and devotes himself to another art where he may shine alone. Some apparently marked talent seems to fade at adolescence and never reappear; some special capacities do not declare themselves until the 'teens. High general intelligence on the other hand, as we have seen, tends to be fairly constant; the able child becomes the able adolescent and adult; only rarely, and then usually for reasons to be traced to emotional problems, does intellectual brilliance fade.

There is thus the problem of guidance posed in a peculiarly acute form. High general ability needs to be " fed," talent should also be trained. There is always the quite serious risk that if an apparent special talent is in fact a transitory expression of high general ability and if special steps are taken to train it, the child may miss more general opportunities; he may also find that his gift fades, but at a stage too late for him readily to change direction. This is least likely to occur in fields like mathematics, closely related to the general curriculum and most likely to occur in such things as music, singing and the dance. The matter is complicated by the fact that the full development of some talents—notably executive skill with certain musical instruments—demands an early and fairly intensive training before the bones and muscles are set.

Even more subtle and difficult to unravel in each individual case are the effects which a supposed special talent, and the special education and expectations that may go with it, may exert upon personality. Here one may think of children from their childhood brought up to dance or to a theatrical career—but who subsequently turn out not to be superlatively gifted in their chosen field.

In most developed countries, schools exist, at least at the secondary stage, which have a bias towards a particular art, usually music and singing, sometimes the visual arts. There are also, in most such countries, regulations which impose on children concerned with the stage as performers or learners, the obligation also to follow a full general education, although this may well be specially adapted to the circumstances imposed by the profession they wish to follow. Historically the earliest of such specialised schools were the Choir Schools, the main purpose of which was to train suitable boys for Cathedral Choirs and at the same time to continue their general education.

Such choir schools in the past also were nurseries of theatrical talent and a number of Shakespeare's plays were written for boy actors attached to the choir school of St. Paul's Cathedral. So far as this country is concerned, these are perhaps the nearest thing we have to a system of special education for children with a particular talent; and for the most part today such schools take only pupils at the secondary stage who, on other grounds are considered suitable for an academic education and who are musically and vocally somewhat above average. In the U.S.S.R., there are ballet schools based upon a similar principle and one or two in other countries of Europe.

The problem has two aspects. The first of these is that of the earliest possible identification of special talent; a part of this is the differentiation between a genuinely high level of the special ability or abilities involved and the apparent talent which is in fact an expression of a combination of general ability, interest, familial influence and perhaps some considerable training already given. The second problem is that of combining a reasonable and necessary concentration upon the training and development of a particular gift with a more general education of the intelligence and the personality, so that the individual is neither deformed or narrowed nor prevented at a later stage, if his talent is not in fact truly marked, from entering some other career.

It should be said at once that we have very little exact knowledge on which to base the early detection of special talents. Though there are tests of musical aptitude like those of Wing and Seashore, and of development in drawing, painting like the " Easle Age Scale " of   , these are dependent partly on the kind of opportunity the subject has already had and, so far, have not been used for long-range prediction and guidance. For the most part indeed, such guidance rests upon chance. The child with musical gifts lucky enough to be born into a musical family will probably find the early circumstances necessary for his talent to declare itself sufficiently strikingly to attract attention; a child with similar or even superior native endowment might well not meet the circumstances in which his gifts can declare themselves, at best until his 'teens and perhaps not at all. The same would certainly be true of gifts for the dance or the theatre. On the other hand, talents more in line with the demands of normal curricula, or which may declare themselves comparatively late—such, for example, as a talent for creative writing, or for mathematics, or for scientific enquiry—though they may be overlooked by the home and the school and even by the individual himself, tend to get some opportunity for expression in the ordinary course of education. The visual arts are somewhere in between. Most children draw and paint given a suitable opportunity; by and large, at least up to the age of ten or twelve, however the quality of a child's drawing indicates more his level of general ability than his degree of special talent in the visual field. In the early 'teens, many children turn away from drawing and painting, perhaps because they are more self-critical and partly at least because the schools tend to lay less stress upon it. Later on—often as an extra-curricular activity—a number take it up again. Until twenty years or so ago, few secondary schools in this country did more than provide a few weekly lessons of drawing and painting and woodwork was almost the only craft offered. The revolution in the teaching of art means now that in very many schools opportunities are offered, both in the curriculum and as extra-curricular activity, to practice many of the other visual and plastic arts. Thus, while perhaps it could not be said that artistic ability is sought for, encouraged and actively trained in our schools, it can be claimed that, in many, the circumstances in which it can declare itself exist.

In the present state of our knowledge, probably the only reasonable recommendation that can be made is that the curricula of primary and secondary schools, particularly for the most able children, should be as rich as possible in activities which provide an introduction into the varied fields of artistic and other kinds of creative activity and that there should be in addition, a wealth of extra-curricular opportunities beyond the conventional and often stereotyped hobbies now offered. Parents need help in this respect. The cultivated and active family can nourish talent in many unobtrusive ways; but the range of activities in many families is not large. Much might be done by a school willing, through its parent-teacher association, to draw the attention of parents to the many fascinating creative occupations which can be carried on in the home.

The informal, active primary school probably provides the best chance for talents to show themselves: but the chance alone is rarely enough. It is necessary that the teacher observe the child over a considerable period to see whether any special bent is a flash in the pan, a marked interest leading to above average skill and performance, or something much more striking. It is the teacher's task to feed the interests that show themselves, to foster growth and to some large extent to direct it unobtrusively. In this, however, there are certain dangers—of forcing a talent which does not truly exist, building up the idea in a child and his parents that here is something quite out of the ordinary, and of so pressing a child forward that finally he abandons the chosen activity in disgust.

There is also the danger that a specially-chosen field—art, music, handwork, even writing, scientific experiment or mathematics—may, for the child, become a kind of defence against any reproaches which may be made to him over his only moderate success elsewhere. He may retreat, in fact, into a single excellence to avoid competition or a feared failure in general academic work. It is this which sometimes lies behind the highly specialised intellectual interests of some adolescents or their relative excellence in some art which, as well as knowledge and creativity, also demands a degree of skill which can only be attained by practice. One would rightly regard with some distrust the boy or girl who has become an " authority " on, say, Egyptology but whose work in History or Geography was mediocre or the child who, through constant practice, had become a more than competent draftsman but the content of whose drawing or painting was mediocre.

Creativity

This leads us to consider what is perhaps the most important aspect of the education of highly able children. There are relatively many more people of outstanding general intelligence than there are who are truly creative; and there are many who have talent, trained or untrained, but which is reproductive rather than creative. Creativity is, in most fields, the mark of what we call genius; and, in the solution of almost all problems other than those which have a more or less artificially preordained solution, creativity enters. Surprisingly little research has been devoted to creativity so that we know very little indeed about what it is psychologically, whether the conditions vary according to the field in which it is expressed, how it develops and how education may foster it. We may, however, hazard a few speculations. In a very real sense, creative work involves the recombination and expression of acquired knowledge and experience. For some of the creative, at least if not for all, this may mean the ability to throw up a very considerable number of ideas or solutions or imaginative combinations of ideas and experiences rapidly. For this a state of excitement is probably necessary. Among the material thus produced, there will be good, indifferent and bad. Hence there is the second aspect, that of selection—a critical and refining task. In varying degrees, it seems possible that these two operations are necessary to real creativity as it shows itself in any intellectual, artistic, scientific or social field though the way in which they manifest themselves will be very different from situation to situation and from person to person. But as well as an intellectual content, an emotional stimulus or excitement, and an acquired mastery of the vehicle of expression, there is, if creativity is to come to fruition, a series of personality variables which make possible the creative moment itself, which provide the drive and the energy necessary to carry inspiration to its embodiment in a sonnet, a picture, an epic, a lifetime of research or the steady implementation of administrative vision over decades.

Here we should pause to reflect upon the profound psychological truth in the remark—attributed, among others, to Edison—that ninety-nine per cent. of genius is hard work. What in fact this implies is that unless the mind is richly stored with experience relevant to the particular field and unless the expressional skills involved—whatever they are—have been mastered by much practice until they are virtually automatised, the mere imaginative up thrust of " inspiration " will not in fact have the content of genius nor will it find adequate expression. In a remarkable analysis of the *Ancient Mariner* and of *Khubla Khan*, Livingstone Lowes lays bare some of the mechanisms of the mind and the imagination that led Coleridge to write his two or three great poems, so unlike in imaginative and creative quality the rest of his poetic work. Lowes shows how Coleridge's reading of many travel books affected his imagination in a way that was at least partly subconscious and how, under the pressure of excitement, whole phrases emerged to colour what he wrote. A similar process can be traced in Keats, who frequently refers to it as " the magic hand of chance " both in his letters and in his verse. So, too, Caroline Spurgeon's careful analysis of the imagery used by Shakespeare points to the richness of the experiental content of the dramatist's mind. In another field, the biographies of inventors and scientists are full of examples of how a period of arduous and frustrating work, ending in fatigue and almost in despair, is suddenly crowned by a flash of insight, an insight which sometimes comes in a dream.

Thus, we may postulate that creativity is likely to result from a well-stored mind (and relatively high general intelligence is necessary for this as well as a certain fineness of perception) plus a certain " fluidity " of interchange between the conscious and unconscious or subconscious levels of thought, the possibility of a " fluency " of ideas and elements of ideas coming in rapid and varied combinations and finally the judgment necessary to reject those which are banal, irrelevant or bad and to accept and express the new.

If this is indeed so—and we should remind ourselves at this point that what has been said is speculative—then there are certain educational consequences and certain hypotheses upon which it would be valuable to undertake systematic research. The first question which might be asked is the fundamental one: does our education in fact foster creativity? Much of the work done in school at any level must be reproductive—that is, it depends upon the learning of facts and of the relations that exist between them. Examinations, of course, tend to emphasise this aspect almost exclusively. Moreover, in most of the familiar fields of the school curriculum, any creative effort of the young—or even of their teachers—is bound to be somewhat naive, bizarre or callow, since the body of acquired knowledge and thought is immense and most of the combinations of ideas and facts upon which the young could stumble have already been discovered and either accepted or eliminated. To be creative in the full sense in such fields as the natural sciences, history, geography, mathematics, requires a long and intensive apprenticeship far beyond school days. On the other hand, the visual arts, music and English do seem to permit genuine creativeness even for the young—though for its full expression an equally stern apprenticeship to the specific techniques of expression is ultimately necessary. Finally, we may ask whether in the broad field of interpersonal relationships, of the general running of the school community and its social life, pupils are helped and encouraged to learn how to express themselves creatively; and how a community may in fact " create."

Some worthwhile experiments have been made to stimulate the creativiness of children in writing and, in the hands of imaginative adults, like Marjorie Hourd and the students she trained, it is surprising what can be achieved. To the writer it seems that even more could be done if the whole educational method were intended to stimulate the twin processes of imaginative summoning up of ideas, experience and knowledge in a mood of excitement and the following of this by a careful, critical selection and rejection of what is commonplace, inapplicable or useless. Even in the learning of science and scientific method, this has its place, though, of course, there are limitations on what can be done. However, it is at least worth asking the question whether didactic teaching is not the principal means of deadening any creativity the child may possess; and whether, therefore, our use of it should be sparing and only when it is the indispensable means of covering a certain amount of ground not to be acquired in any other way.

Certain work in the United States on creativity leads us to ask yet another question. In this work, two radically different types of test were used: the one of the conventional type which requires verbal reasoning along familiar lines; the other called for richness and variety of response rather than a foreordained correctness. Children who scored high on the first type of test and comparatively low on the second proved to be the " good scholars," the pupils who learned what they were taught rapidly and well and who gave little or no trouble to their teachers. In the judgment of their teachers their academic work was good. The children who did better on the second kind of test tended to be academically as good as the first group but were not rated as being so good by their teachers and they were much more troublesome. These results are only suggestive: but they do suggest two things—that the presuppositions of our educational system are such that they favour the intelligent conforming pupil rather than the intelligent creative one; and that possibly the inbuilt machinery of selection in our system—streaming in the primary schools, the allocation procedures, the end-of-year examinations, the G.C.E. and subsequent public examinations—may be continuously favouring conformity and at various points depriving the unconventional but intelligent child of his chances.

It should be reiterated, at this point, that this is speculative: research on creativity is in its infancy in the United States and has hardly begun here yet. What is suggested is that this is a question well worth attention and one to which the observations of teachers both at the primary and at the secondary level could be directed. In doing so, one should bear in mind the fact that the means we have of assessing intelligence are in fact largely determined by the kind of education which we give our children, especially in school, though also in the home and community. It is possible that, because we place a heavy premium on the reproduction of facts and opinions and upon the direct acquisition of skills, we overlook or even starve an equally important aspect of growth—that of fluency and vigour of imagination which, like a volcano, throws up much ash, rubbish and mud, but also precious metal. At all events, the fact that so many of the truly creative were more or less maladjusted to the kind of education they were given should give us pause.

In the identification and education of children of high general learning ability we have got much further than we have in the identification of talent and creativity and it is true to say that in this country at all events few outstandingly able children now fail to get a more or less suitable education—with the proviso that our system lays stress on the kinds of learning ability demanded by curricula which are for the most part verbal and in the later stages highly abstract and symbolic along two quite clearly defined lines—verbal symbolism and abstraction which is the principal vehicle of all education at the secondary grammar and university levels (and, indeed, even of technical education) and numerical symbolism and abstraction. Other forms of thought—musical, concrete, form and colour—though not entirely neglected occupy a much less important place, especially in the kinds of test or examination which are the sanctions of education and training.

The education of those who are outstanding because of their general educable capacity, the children who do exceptionally well in school and in the various forms of tests and examinations which we use to measure intelligence presents in many ways a less intractable series of problems—though here again, while there is much experience in European educational tradition and in the United States, there is little solid evidence as to the relative value of the practices in use.

There seem to be three principal categories of problem. The first of these is that of ensuring that the child who learns fast should not be kept waiting while his less able contemporaries catch up. At the same time, we wish to ensure that intellectual development does not so far outstrip emotional and social growth as to produce the more unpleasant features of the stereotype of the precocious child. The second is that of avoiding the cynicism and egocentricity which may come if the intelligent child, uninhibited by experience, sees through adult compromises and if he is segregated among an *élite* from his more ordinary fellows. Put more positively, it is the problem of how a value system which emphasises service to others rather than personal advantage may be made compatible with an education which inevitably, however it is managed, sets the very able apart from their contemporaries. The third, and in some ways the most intractable problem is that of avoiding—for the very few very able children—intellectual and social isolation.

Acceleration

To solve the first of these problems two main methods—" acceleration " and " enrichment "—have been advocated and most educational systems show a combination of both. The majority of schools, outside this country, are organised on the basis of a grade system. This means that in the primary school at least, there is a programme of studies, divided into years, through which a child is supposed to progress in step with his age but where passage from year to year is dependent upon his having attained a certain mastery of the previous year's work—as it used to be in the days of " standards " in this country. Thus, a pupil who has not attained an agreed level of mastery as judged by his teacher or by the results of an examination does not pass into the next grade and in fact repeats a year. On the other hand, children who learn markedly faster than their contemporaries can jump grades. In such systems will be found children one, two and even three years behind or in advance of the grade held to be normal for their chronological age. The very able child, then, would be expected to jump classes in his primary school and probably also at the secondary stage.

This process of *acceleration* is open to several disadvantages. Terman and others have found that while very able children tended to be accelerated by one or two grades in school, their actual grades and level of attainment fell considerably below what they might have been if their general learning ability had been stretched to its fullest extent. In American schools, at the time Terman was making his studies, it seems probable that proportionately more children were accelerated than in European schools, where few systems have more than two or three per cent. of children in grade more than a year in advance of their chronological age. Some of this " retardation " of the very able is due to the nature of the curriculum itself. Where a school system has a prescribed curriculum, certain parts of it are taught in a given year and not in another. The child who skips a class, however able he may be, may well encounter difficulties which he cannot surmount unaided. Thus, in the absence of some special arrangement whereby grade acceleration is matched by measures to help the bright child to pass through the intervening work more rapidly, there is a limit to acceleration.

A more serious difficulty is that, while the bright child may in all the intellectual fields covered by the school curriculum be capable of work three or four or even more years in advance of his chronological age, physically, biologically, emotionally and socially, though he may be somewhat in advance, he is unlikely to be on a par with his intellectual equals who are three or four years chronologically older than he. Thus, a policy of acceleration for the very able, fully applied, would put the bright pre-adolescent in a class with adolescents who in every respect but school learning, were living in an entirely different emotional world.

Acceleration at the Secondary and University levels

However, where acceleration is used with a group large enough to justify special arrangements and special treatment, the evidence suggests that it may prove very successful indeed. Under the auspices of the Fund for the Advancement of Education, a series of experiments in curricula and method were undertaken in American High Schools aimed to enrich and accelerate the curriculum for able students so that they could enter college two years in advance of the normal age. In all, some 1,300 students were concerned, entering twelve colleges. Academically, the early entrants outperformed their class as a whole and the comparison group of students of normal age. They encountered somewhat more difficulty in adjusting themselves to college life than the older students with whom they were compared but most of these difficulties were minor and easily overcome. There was evidence that, in many cases, early admission to college freed the students from the boredom and frustration of an unchallenging school environment, gave them new intellectual momentum and enhanced their social and emotional maturation.

Enrichment

An alternative or auxiliary to acceleration, is *enrichment*. In essence this is what is done when classes in our primary schools are streamed or grouped by ability. Having an age promotion system the English primary school cannot in fact accelerate bright pupils. But it is possible to carry bright children further in such basic subjects as mathematics, reading and the mother tongue, and to bring into the general educational experience, much material for which slower learning children would not have time. It is certainly easier to do this, if all the ablest children are gathered together into one class or, in schools where this is not possible, if they are put into a separate set for the basic educational skills and at other times allowed to go ahead at their own rate. Elsewhere in this journal and in a previous number, such evidence as we have of the educational effects of streaming, is summarised. It seems likely that, if it is properly used, streaming does allow a programme which can stretch the learning capacity of the bright child to the full and prevent him from becoming bored. Grouping the ablest together is likely to increase the intellectual stimulation they give each other and, at the same time, the very outstanding may find a reasonably congenial atmosphere. On the other hand, there may be a disadvantage of a general kind in that the other classes feel their inferiority and that teacher and taught alike miss the stimulus which bright children can give. Perhaps most important, though usually overlooked, is the lesson which bright children segregated into "A" streams in primary schools and intensively coached to pass the eleven-plus may draw from their situation—that the possession of high ability for school work is a personal asset to be exploited for personal ends and carrying with it only the obligation to cover one's superiority with a decent modesty.

Some recent work in Sweden carried out by Husen and Svensson tends to suggest that the " streaming " of the most able is differential in its effects according to the social environment from which the able children come. They sum up their results as follows: " Children from culturally less privileged homes responded most strongly to selective academic type teaching. Children from homes of higher status apparently are receiving full intellectual stimulation outside the school." Under most conditions, selective streaming, except perhaps for the small proportion of children whose educational difficulties are considerable, is not an essential expedient. It is usually possible in the primary school to have sets within the class for the essential instruction and to make up groups, either cross-sectional, or homogeneous, according to the circumstances, in which the very able child's possibilities of collaborative leadership, of learning how to make a contribution which no one else can make and generally of working with all manner of men and accepting their differences can be brought out.

Selected Secondary Education

At the secondary stage, the problem is less tractable and some broad segregation is probably unavoidable. In this country this means that some fifteen to twenty per cent. of children are educated together in academic schools—themselves very often streamed—and the rest in comprehensive, secondary modern, bi-lateral or technical and commercial schools. It has been suggested by one prominent educationist that we should educate only the ablest five per cent. in schools specially set aside for the purpose and that the rest should pursue their secondary education either in comprehensive schools or in a somewhat less selective form of our present secondary school system. Some of the independent and direct grant schools do tend in fact—partly by their social constitution and partly by the rigorous selection for entry—to educate mainly the ablest five per cent. or less of the age-group. Schools like Winchester, Manchester Grammar School and King Edward's School, Birmingham, probably do not have many pupils who would fall outside the top five per cent. of their age-group on any intellectual criterion and up and down the country there are others of a similar kind. Within the large grammar schools, too, considerable use is made of streaming so that, roughly at all events, the top streams have the abler pupils and very often such pupils pursue accelerated courses that bring them to public examinations somewhat earlier than their contemporaries and allow a longer period in the sixth form where a wider choice of subject and more individual attention are possible.

This system is the envy of those American educators who point to the undifferentiated nature of their own system and the frustration or bad habits it may mean for the ablest. By and large it is similar to the system in use in most countries of continental Europe and stems from a long tradition in which aristocratic traditions mingle with the social purpose of educating the ablest children irrespective of their origins. However, there may be certain considerable defects. There is no certainty that the very ablest children—the one or two in a hundred thousand—will in fact find a school which will challenge them to the full and which will provide them with that companionship which they so sorely need. For many more the increasing competition for university entry means that as their education progresses in the grammar school it becomes more and more limited to a small number of subjects which have to be studied with a particular series of examination requirements in view. Finally, while the good grammar school is not unaware of the social development of its pupils, of their emotional and social growth and of the way in which the school influences the structure and content of the values with which they face the world, few indeed consciously and deliberately train the intellectual *elite* which they have for the kind of leadership which society needs.

Conclusion

So rapid a survey as the present can do little except draw attention to the gaps in our knowledge and to the numerous problems which seem to call for research and experiment. By and large, our process for the identification of high ability of the kind necessary to success in our educational system and in general in many—but not all—the walks of life probably works efficiently in one direction. We do seem to find and educate enough bright children and adolescents to fill the places in our grammar schools and universities. On the other hand, very little is known of the kinds of negative selection that go on, about the proportions and kinds of children who are eliminated at various stages either because their forms of thinking are not appropriate to the education they are given or because they fall behind at one stage of their growth and do not catch up again. It is worth noting here that errors in selection, however small they may be, are likely to accumulate since only those selected by one process go on to the next. Hence the continuous guidance of children is of primary importance.

The second group of problems and one which has scarcely been touched by research is the identification and education of special talents; there may be few or no " mute inglorious Miltons," but it is by no means so sure that mechanical inventiveness or the combination of practical sense with a feeling for mass, form and line which underly architecture, always make their way unaided; and there may be brushless and inglorious Rembrandts.

High ability is not enough to meet the needs of a growing community. In all walks of life what is needed more than anything else is trained creativeness; and we are far from having solved the problem of how we may at once hand on the immense accumulation of human experience which is the material of education and stimulate pupils and students to think constructively about it, finding new solutions to the new problems with which they are faced.

Finally, there is the whole problem of the constructive education of the ablest group so that they may see their gifts as a trust and as an obligation to service. This is, indeed, the core of the whole question.

Bibliography

BUROS, O. K. (Ed.). *The Fifth Mental Measurements Yearbook.* The Gryphon Press, New Jersey, 1959.

CALGARY SCHOOL BOARD. *Committee on Gifted Children.* Final Report on Practices in Other School Systems (Duplicated). February, 1954.

CITY OF OTTAWA PUBLIC SCHOOLS. *Chief Inspector's Annual Report.* Ottawa, 1952.

CITY OF OTTAWA PUBLIC SCHOOL BOARD. *Study of Gifted Children.* Ottawa, 1956.

EDUCATIONAL RESEARCH COMMITTEE DISTRICT 13, O.P.S.M.T.F., ONTARIO. *A Study of Pupil Acceleration* (Duplicated). May, 1958.

ELSON, A. S. " A Plan to Reduce the Ontario High School General Course to Three Years for Bright Pupils." *The Bulletin*, March, 1956.

ETOBICOKE BOARD OF EDUCATION. *Progress Report: Classes for Exceptional Children.* 1957.

FUND FOR THE ADVANCEMENT OF EDUCATION. *They Went to College Early.* New York, 1957.

GALTON, F. *Hereditary Genius.* 1869.

GESSELL, A. *Exceptional Children and Public School Policy.* New Haven, Yale Univ. Press, 1921.

GOLDBERG, M. L. "Recent Research on the Talented." *Teachers College Record*, Vol. 60, No. 3, December, 1958.

GOLDBERG, M. L. *Research on the Gifted* (Duplicated). Horace Mann-Lincoln Institute, Columbia University, New York (N.D.).

GOLDBERG, M. L. and Associates. *A Three-Year Experimental Program at De Witt Clinton High School to Help Bright Underachievers.* De Witt Clinton High School.

HORACE MANN-LINCOLN INSTITUTE, COLUMBIA UNIVERSITY. *Bulletins and Other School-Produced Materials on the Education of the Gifted* (Duplicated).

HUSEN, T. and SVENSSON, N. E. "Pedagogic Milieu and Development of Intellectual Skills." *The School Review*, University of Chicago Press, 1960.

HOLLINGWORTH, LETA S. *Children Above 180 I.Q.* World Book Company, New York, 1942.

HOLLINGWORTH, LETA S. "The Child of Very Superior Intelligence as a Special Problem in Social Adjustment." *Annuals of the American Academy of Political and Social Science*, Vol. CXLIX, No. 3, 1930.

HOLLINGWORTH, L. *Gifted Children.* MacMillan, New York, 1924.

HAVIGHURST, R. J., STEVENS, E., and DE HAAN, R. F. *A Survey of the Education of Gifted Children.* Univ. of Chicago, Supp-Ed-Monog., No. 83, Chicago, 1955.

HECK, A. O. *The Education of Exceptional Children.* McGraw-Hill, New York, 1953.

HENRY, N. B. (Ed.). *The Education of Exceptional Children.* Forty-ninth Yearbook, Nat. Soc. for the Study of Educ. Univ. of Chicago Press, Chicago, 1950.

HENRY, N. B. (Ed.). *Education for the Gifted.* Fifty-seventh Yearbook, Nat. Soc. for the Study of Ed. Univ. of Chicago Press, Chicago, 1958.

HOURD, M. L. *The Education of the Poetic Spirit.* Heinemann, London, 1949.

HOURD, M. L. and COOPER, G. *Coming into their own.* Heinemann, London, 1959.

KENDRICK, A. C. "The Gifted Child." *The B.C. Teacher*, April, 1956.

LOWES, L. *The Road to Xanadū*, Constable, 1951.

MARTEUS, E. H. *Curriculum Adjustments for Gifted Children.* U.S. Office for Educ., U.S. Gov. Printing Office, Washington, 1946.

PASSOW, A. H. "Developing a Science Program for Rapid Learners." *Science Education*, March, 1957, Vol. 41, No. 2.

PASSOW, A. H. and BROOKS, D. J. "Mathematics and the Gifted Student—Some Problem Areas." *The Bulletin of the Nat. Assoc. of Sec. School Principals*, Vol. 43, No. 247, May, 1959.

PASSOW, A. H. and GOLDBERG, M. L. "Curriculum Research." *Educational Leadership.* November, 1958.

PASSOW, A. H., GOLDBERG, M. L., TANNENBAUM, A. J., FRENCH, W. *Planning for Talented Youth.* Bureau of Publications. Teachers' College, Columbia, 1955.

PILCH, M. M. *On Provisions for the Gifted* (Duplicated). (N.D.).

PILCH, M. M. *Criteria for an Evaluation of Programs for Gifted Students in Representative Schools* (Duplicated). St. Paul's Public Schools, Minnesota.

PILCH, M. M. *The Saint Paul Student Development Program* (Duplicated). September, 1958. There are other duplicated reports in this series not listed here, covering various technical aspects of the Saint Paul Public Schools Inquiry.

RESEARCH COMMITTEE OF THE ASSOCIATION OF HEADS OF GUIDANCE DEPARTMENTS, TORONTO SECONDARY SCHOOLS. *Gifted Students in the Toronto Secondary Schools—Phase I, Sociometric Study.* Toronto, March 3, 1958.

RESEARCH COMMITTEE OF THE ASSOCIATION OF HEADS OF GUIDANCE DEPARTMENTS, TORONTO SECONDARY SCHOOLS. *A Study of Thirty-two Gifted Students of the Toronto Secondary Schools.* Toronto, December 8th, 1955.

RIDEOUT, E. B. "The Gifted Child. Part I." *The Bulletin*, September, 1954.

RIDEOUT, E. B. "The Gifted Child. Part II." *The Bulletin*, November, 1954.

SPURGEON, C. L. *Shakespeare's Imagery*, Cambridge University Press, 1935.

SUMPTION, M. R. *Three Hundred Gifted Children.* World Book Company, New York, 1941.

TERMAN, L., *et al.* *Genetic Studies of Genius*, Vol. I. *Mental and Physical Traits of a Thousand Gifted Children*, Vol. II. *The Gifted Child Grows Up.* Stanford Univ. Press, Stanford, 1925 and 1947.

U.S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE. *Your Gifted Child.* Children's Bureau Publication, No. 371, 1958.

WERNER, E. *Social Competence of Kindergarten and Fifth-grade Children as evaluated by the Vineland Social Maturity Scale.* Unpub. Ph.D. Thesis, Univ. of Nebraska, 1955.

WITTY, P. (Ed.). *The Gifted Child.* D. C. Heath & Co., Boston, 1951.

WORCESTER, D. A. *The Education of Children of Above Average Mentality.* Univ. of Nebraska Press, Lincoln, 1956.

Guidance Techniques:

INTERVIEWS

by Frank Barr

Introduction

PERHAPS interviews are the most commonly used method by which candidates are selected for or guided into careers and courses of education. In addition they are employed by research workers to gain information on a number of social and educational problems. Often much is based upon conclusions drawn from them and reasons for their popularity are not hard to find.

Compared with developing and using other techniques such as questionnaires and standardised tests, they are less demanding of resources of time and money. Other advantages are also claimed for this device. When used for selection or guidance, interviewees whose hopes are not entirely fulfilled are, it is said, more likely to accept adverse decisions when reached through personal contact with an interviewer than through the impersonal agency of test scores. In addition, both selectors and research workers consider that an interview allows them to gain an insight into, for example, a student's home background as well as giving opportunity for closer and more detailed questioning than is possible with other methods.

Its use is so common and firmly accepted that it is pertinent to consider critically the degree and extent of credence which can be placed upon conclusions drawn from an interview. At the same time it may be worthwhile to look at some factors briefly which limit its value and some suggestions which have been made for overcoming them. As a preliminary step it will be useful to crystallize some conclusions drawn from research data around two major criteria: reliability and validity.

Reliability of Interviews

Assessments of an individual's physical, psychological and social traits derived from an interview may be considered reliable if a closely similar result be obtained upon a re-interview under closely similar conditions. Expressed in numerical terms, as a coefficient of correlation, complete agreement of assessments from the two interviews would be represented by 1.0 whilst a total lack of agreement should be indicated by 0.0.

Measures of general ability such as standardized tests used in secondary selection, tend to have reliability coefficients as high as 0.98. This means that two administrations of the same test after a time interval of about three months have a very high level of concordance.

Intelligence tests, however, measure one relatively stable factor whereas in an interview we are attempting to assess a complex and probably varying series of aspects of personality such as interests, motivation and acceptability to others. It would, therefore, be unreasonable to demand a similarly very high reliability coefficient from an interview designed to measure several factors, some of which tend to fluctuate within wide limits. Accordingly, experienced workers like Vernon consider that lower coefficients are acceptable in assessing personality than in abilities. Between .50 and .70 he accepts as being low but passable; .70 and above as satisfactory; and .85 and above as being rather suspiciously high unless obtained from very carefully controlled situations.

Vernon cites several examples of interview reliability. In one, Hollingworth studied 12 Sales Managers who each interviewed independently 57 applicants ranking them for their suitability for posts. There was such variability in the different interviewers' assessments that each applicant received a ranking which ranged almost from the top to the bottom of the list. Another study, by Hartog and Rhodes, found that the coefficient of reliability between two Civil Service Board interviewing the same candidates was only .41.

Many other studies are similarly reviewed by Vernon who found them, in general, to give coefficients of between .50 and .60. He expresses this as being equivalent to a situation where two interviewers working independently interviewed 100 candidates each being asked to pick the best 20. With the above level of reliability they would agree on 9 candidates only, disagreeing on the remaining 11. This general conclusion is supported by Bingham and Moore.

Validity of Interviews

An interview's *validity* may be determined when its conclusions—for example, about a candidate's suitability for a course of education—are measured against some external criterion such as the results of an external examination.

Before the Second World War, McClelland, in a " follow up " study of secondary school selection in Scotland, found that primary school Headmasters' assessments made in interviews did not reduce later failure rates. After considerable personal experience and a careful study of many reports of selection in the Armed Forces during the war, Vernon and Parry also came to the conclusion that interviews were poorer than standardised tests as predictors of success. Later, Himmelweit compared interview assessments of students admitted to the London School of Economics with their degree marks and found a very low validity, whereas a short entrance examination gave a positive prediction and a battery of aptitude tests proved to be of even greater value.

As with reliability, however, it is unreasonable to compare the best of one type of measuring instrument with the worst of another. In addition, validity levels will be lower when applicants who are accepted on the basis of an interview are ' followed up,' as they are already a highly selected group. However, even with these reservations the overwhelming conclusion must be drawn that interviews are relatively unreliable and of low validity.

Research into methods of improving interviews

Despite grave disadvantages, Vernon and Parry consider that the interview still has a prime role to play and accordingly advocate further attempts to improve it. A considerable amount of work has been undertaken which appears to centre on four main problems.

The first concerns the degree of standardisation which is desirable in the interview situation. For example, should the situation be carefully structured so that conditions between one interview and another are as closely similar as possible, or should each interview be allowed to take a course guided solely by the interviewee? British practice appears to prefer a middle course whereby the main questions are determined beforehand but a wide latitude is left as to when they are presented and how the leads which they may give should be followed.

Secondly, there is, of course, the problem of subjective bias on the part of the interviewer and the quite understandable tendency of candidates to give what they consider to be " acceptable " answers for the occasion. One example often quoted of the first aspect is reported by an American psychologist, Rice, who studied the conclusions of two interviewers trying to find reasons for the destitution of applicants for financial aid. One, of strong political views, attributed 39 per cent. of cases to industrial conditions and 22 per cent. to over-spending on alcohol; the other, an advocate of temperance, allocated 7 per cent. and 62 per cent. to these categories respectively. This problem can never be entirely overcome but may be alleviated by taking other more objective measures into account. At the same time these may also be useful to measure the veracity of interviewees' replies.

The third problem poses two main questions: what kind of information should interviewers seek, and how should it be measured? Charters points out that as with other techniques, interviews only sample behaviour. Accordingly, whilst it is possible to assess factors such as appearance, manners and agreeableness, great caution should be exercised about inferring too much either about these traits in other situations or about other traits not brought into play in the actual interview. In general, it appears to be rather pointless to seek facts which can be obtained more readily from a questionnaire or test, except when corroboration is needed. Most reports encourage interviewers to limit the scope of questioning to discover the interviewees' attitudes to relevant problems.

A considerable literature has been written about the second aspect. One favourite device is a Rating Scale although Bingham and Moore consider its main disadvantage to be its superficial appearance of objectivity and stress that it is a relatively crude means of grading replies. However, as Guilford points out, a well-constructed and intelligently-used scale can be of considerable help to interviewers.

Finally, nearly all the research reports which have been reviewed indicate that the essential problem can only be tackled by a careful selection and training of interviewers themselves. Here Festinger and Katz list three main objectives of a training programme: to clarify the purpose of interviewing; to impart specific skills and techniques; and to give the interviewer a sense of purpose and understanding of the value of his work.

Whilst all three are clearly of great importance the reports generally place especial emphasis upon the last objective. There appears to be widespread agreement that the key to a successful interview, either for guidance or research, is the understanding and sympathy with which the interviewer approaches the interviewee.

Bibliography

BINGHAM, W. VAN DYKE and MOORE, B. V. *How to Interview.* New York: Harper Bros., 1941 (Third Revised Edition).
FESTINGER, L. and KATZ, D. *Research Methods in the Behavioural Sciences.* London: Staples Press, 1953.
GUILFORD, J. P. *Psychometric Methods.* New York: McGraw-Hill, 1936.
LUNDBERG, G. A. *Social Research—A study in methods of gathering data.* New York: Longmans, 1942 (Second Edition).
OLDFIELD, R. C. *The Psychology of the Interview.* London: Methuen, 1943.
SUPER, D. E. *Appraising Vocational Fitness—by means of psychological tests.* New York: Harper Bros., 1949.
RICE, S. A. " Contagious Bias in the Interview." *Amer. J. Sociology,* 1929, 35, 420-423.
TYLER, L. E. *The Work of the Counselor.* New York: Appleton-Century-Crofts Inc., 1953.
VERNON, P. E. *Personality Tests and Assessments.* London: Methuen, 1953.
VERNON, P. E. and PARRY, J. B. *Personnel Selection in the British Forces.* London: University of London Press, 1949.

Research Note:

PREFERENCES AND VALUES AMONG ADOLESCENT BOYS AND GIRLS

by C. M. Fleming, D. F. Digaria and H. G. R. Newth
University of London, Institute of Education

CONSIDERABLE interest attaches to the study of the attitudes, values and preferences of boys and girls as they pass from childhood through adolescence to adult status. Much has been written on the topic; but there are relatively few records which trace actual changes in the viewpoint of children as they grow. This may be attempted either through long-term follow-up studies of groups of young people over a period of years, or through cross-sectional records of the reaction of adolescents of comparable education and similar social settings on a given date. Both methods require, however, something of the nature of standardised test material suitable for the assessment of personality in the field of adolescent interests and values. They require also the active co-operation of teachers, club-leaders and parents along with willingness on the part of boys and girls to engage in self-observation and to admit their preferences as to occupations, expenditure of money, relationship to other people, ambitions, and the like.

These conditions appear to have been fulfilled in three investigations whose findings have recently become available. The personality test used in all three was one which permitted the subjects to indicate by voting their approval of or agreement with selected opinions and descriptions of situations in schools or clubs. (Give 4 votes to those statements with which you agree very strongly, 3 to those which you think the next most sensible ones, and 2 to those about which you are doubtful. Give 1 to those with which you agree least and 0 to those with which you do not agree at all.)

Using One's Hands

Making things with one's hands is the most satisfying of all occupations ....

Being with Other People

I am happiest when with other people .. ..
Working in a team irritates me .. ..

Talking about School

Going to school is a waste of time .. ..
Most boys and girls who leave school wish they were back .. ..

For the Christmas Play

Joe said he would fit up the electric lights .. ..
Jessie offered to watch the words and help those who forgot their parts ....
Sam said he was willing to take part in the play .. ..
Beth said she would write an account of it for the newspapers .. ..

In the Club

Jean said she would like to learn to play in a band .. ..
Bob said he wanted to learn about politics and government .. ..

The items of the test had been chosen to give a representative assessment of the preferences and values of boys and girls in the three fields of interest in things (collecting things, handling things, or making things); in people (studying people, being with people or managing people); and ideas (finding things out, thinking things through and/or designing experiments).

I. An Enquiry into the Preferences and Attitudes of a Group of Girls at ages Thirteen and Sixteen

Through the courtesy of the headmistress of a girls' grammar school and with the co-operation of the staff a very thorough study was made involving teachers' ratings on personality, pupils' opinions of themselves and pupils' responses to a standardized personality assessment. Ninety girls were tested at the average age of thirteen years and the test was repeated three years later with the same pupils.

Average preference scores are shown below (along with their standard deviation).

Age	Things	People	Ideas
13	54.78 S.D.8.43	59.11 S.D.9.53	42.50 S.D.9.2
16	50.22 S.D.9.81	60.78 S.D.10.74	50.17 S.D.8.18

An interest in people remained relatively stable in the group as a whole over the three years while preferences for things decreased and activities concerned with ideas came to be valued more highly. Test-retest correlations over the three years expressed the same pattern in a different fashion (for people +0.66, for things +0.44 and for ideas +0.37); and inter-correlations between the types of preference were indicative of independence among these values.

Age		Things	People
13	People	—0.37	
	Ideas	—0.31	—0.31
16	People	—0.48	
	Ideas	+0.22	—0.45

II. Long-Term Studies of Two Groups of Boys

Sixty-four boys in Form II of a grammar school were tested each year for four consecutive years with the same objective test of adolescent preferences—and another fifty boys who entered the school a year later were similarly followed up for five years.

In the first group the boys' expressed interest in people did not differ significantly over the four years from their initial average vote of 46.0 (S.D. 9.5) while a similar stability at a lower level was recorded for ideas (41.5 S.D. 9.5 at the first testing and 40.5 S.D. 9.0 on the fourth occasion). In contrast to this, their preference for things showed a significant decrease (from 51.25 S.D. 8.75 on the first testing to 44.6 S.D. 11.5 on the last testing).

In the second group, the boys' preference for things showed a steady and significant decline of rather more than eleven points of interest score over the five year period with, again, an absence of significant differences in the interest scores for people (from 51.0 S.D. 7.5 on the first testing to 48.1 S.D. 8.0 on the fifth occasion) or for ideas (from 45.8 S.D. 9.5 on the first testing to 43.1 S.D. 9.5 on the last testing).

Test-retest correlations over the years were from the first to the fourth testing in the first group, +0.45 (things), +0.32 (people), +0.58 (ideas); and from the first testing to the fifth testing in the second group, +0.58 (things), +0.38 (people), +0.58 (ideas).

Inter-correlation among the types of preferences again showed the relative independence of an interest in things, a concern with people and an emphasis on ideas.

Interval		Things	People
Four years	People	+0.11	
	Ideas	—0.11	+0.12
Five years	People	—0.03	
	Ideas	+0.30	+0.05

III. A Cross-Sectional Study of Boys and Girls

Five hundred boys and girls from secondary modern schools in the neighbourhood of the boys' grammar school were also examined with the same personality assessment (P.A.I.). This provided data from fifty boys and fifty girls in each form from I to V in age-groups of average ages ranging from $12\frac{1}{12}$ to $16\frac{2}{12}$ (boys) and from $12\frac{2}{12}$ to $16\frac{9}{12}$ (girls).

In this cross-sectional study there was for both the boys and the girls an absence of significant differences over the five years in expressed interest either in people or in ideas. This was coupled with a significant decrease in their preferences for things—the decline being for boys from an average vote of 58.2 S.D. 10.25 in the first form to 53.2 S.D. 10.2 in the fifth and for girls from 45.4 S.D. 11.25 in the first year to 40.9 S.D. 11.5 in the fifth.

To a greater extent than was anticipated there was thus a similarity in the interest pattern of both boys and girls, grammar school pupils and pupils from secondary modern schools. While an interest in things was high in all groups in the early stages of secondary schooling and while girls on the whole showed higher relative interest in people in contrast to the boys' more frequent expression of greater preference for things, these differences were not consistently significant, when similar age groups were compared.

In subsidiary enquiries, a factorial analysis of the grammar school boys' preference scores, their school examination marks in English, French, Mathematics and Science and their intelligence test scores indicated that the test on Preferences and Values was measuring something other than, and supplementary to, these appraisals of special attainments and general mental ability; and the pattern of factorial analysis for the girls was roughly comparable to that of the boys. Both the stability and the variations so indicated have been confirmed by other studies of boys and girls from grammar schools, from technical, commercial and art schools, and from secondary modern schools in other districts. Boys and girls in all types of school share an interest in things, in people and in ideas. The differences between groups are not consistently significant and the variations of pattern cannot be predicted from a knowledge of sex, age or educational classification.

Bibliography

1. ALEXANDER, D. J. "An Analysis of Teachers' Estimates and Pupils' Performance at the Stage of Entrance to Secondary Education." *M.A. Thesis*, University of London, 1947.
2. ANSARI, G. A. "A Study of Attitudes and Relationships in a Group of Adolescents at a Youth Club." *M.A. Thesis*, University of London, 1953.
3. DAVIS, J. A. M. "A Study of Confidence in a Group of Secondary School Children." *M.A. Thesis*, University of London, 1944.
4. DIGARIA, D. F. "A Comparative Study of Interests and Abilities in Two Groups of Secondary School Pupils." *M. A. Thesis*, University of London, 1958.
5. EVANS, K. M. "A Study of Attitudes Towards Teaching as a Career." *M.A. Thesis*, University of London, 1946.
6. FLEMING, C. M. "Cotswold Personality Assessment P.A.I. A Study of Preferences and Values for use in Schools and Clubs." Glasgow: Gibson, 1959.
7. HAYES, M. M. "A Comparative Study of Spontaneity as Observed in Group Relationships and Group Activities in Two Parallel Classes of a Girls' County Technical School." *M.A. Thesis*, University of London, 1952.
8. HOWARD, B. S. "A Study of Aptitude for Engineering Drawing at the Age of 13+ with Reference to the Selection of Entrants to Technical Schools. *M.A. Thesis*, University of London, 1945.
9. MORGAN, A. H. "A Study of Patterns of Attraction and Repulsion Within a Classroom." *M.A. Thesis*, University of London, 1951.
10. MITRA, J. P. "Selection of Pupils for Technical, Commercial and Art Schools—a follow-up study." *M.A. Thesis*, University of London, 1954.
11. MOUSTAKA, C. "A Study of the Reactions to Beauty of Certain Groups of Adolescent Pupils." *M.A. Thesis*, University of London, 1953.
12. PASRICHA, B. R. "A Study of the Vocational Wishes of a Group of Secondary School Pupils in Relation to their Interests, Scholastic Attainment and Attitudes." *M.A. Thesis*, University of London, 1949.
13. WIEGERSMA, S. and BARR, F. "Interest Testing in Educational and Vocational Guidance." *Educ. Res.*, Vol. II, Part I, 39-64, November 1959.
14. WILKIE, J. S. "A Study of Some Effects of the Free Choice of Certain Activities and of Companions for Group Work of Junior School Children." *M.A. Thesis*, University of London, 1955.

Research Note:

The Effects of Streaming: A Further Contribution

by W. G. A. Rudd

PRACTISING teachers and other educationists may have been unduly depressed at the possible outcome of any such research by the negative findings reported in the earlier note in this series by Yates and Pidgeon. However, there is research which has given leads to some key issues for investigation which might well yield more positive results.

The object of any form of streaming or grouping is to place each pupil in that educational setting which will give him the best opportunity to achieve optimum, well-rounded growth. Yates and Pidgeon, accordingly, rightly draw attention to certain assumptions about child development which underlie the practice of streaming; and the present article cites some evidence of research known to the writer which is relevant to these assumptions.

1. Does streaming substantially reduce the range of abilities within a class?

In the main, both primary and secondary school teachers believe that a coarse grouping of pupils into two or three categories is a feasible procedure. If pressed, many will justify this belief by stating that streaming substantially reduces the range of abilities to be found within any one class.

Any research seeking evidence to justify such a belief would consider separately, of course, the range of abilities in the criterion on which streaming is based and in other criteria of educational significance. Evidence already available tends to refute this assumption made by teachers. For example, West reported in 1933 that the variation in achievement of ability groups in grades having three homogeneous levels was about eighty-three per cent. as great as the variation in unselected groups, and in grades having two such levels the comparable variation was ninety-three per cent. In 1948 Cook stated that under the most favourable circumstances, that is when pupils are divided into three " homogeneous " groups on the basis of an achievement test battery heavily weighted in favour of reading and arithmetic scores, a reduction of about twenty per cent. in reading and arithmetic variety may be expected. In other subjects such as art, music and hand writing, the reduction of range approaches zero. In the face of such evidence he recommended that, when grouping is practised, it should be on the basis of status and needs in specific learning areas; that is, pupils should be grouped differently in each subject area. Such groups should be flexible in organisation and specific purpose. Recently, Ramey, following an investigation of ability grouping in the junior high school, has reported almost complete overlaping from one group to another. He also stated that the teachers involved tended to generalise and teach according to their perceptions of the homogeneity of the group, neglecting the wide ranges inherent in any group.

The above studies were all carried out in U.S.A. Evidence of the reduction of range of abilities achieved in British schools having different numbers of streams would be very valuable in testing the validity of the assumption.

2. Can teachers deal more effectively with relatively homogeneous groups than with those comprising pupils manifesting markedly different educational needs?

In this issue much turns on the degree of homogeneity achieved within the groups under examination. In addition, however, it is necessary to consider the teaching methods in use, and in particular, the scale of provision for individual differences. Perhaps the best evidence already available is that of Jones, who contrasted, as follows, fourth grade classrooms where varying degrees of provision for individual differences were made:

> (*a*) The experimental groups adapted instruction in skills to each individual's level of achievement and capacity, having no regard to his grade placement. The text and workbook material used was on levels from second to sixth grade. The practice was to use single copies or small sets of books rather than large sets of basic material. The adaptation to individual differences called for grouping within the classroom, varied procedures and careful record keeping. This was true of the content subjects as well as in the English and arithmetic skills measured in the study.
>
> (*b*) The control groups used materials showing a closer adherence to basic fourth grade texts. Any variety which did exist was planned with emphasis on supplementary material rather than on adaptation to individual differences. The most common procedure was to work with the class as a unit and to direct the same instruction to all, seeking to strike the average.

Jones found that during the eight months of her study, significantly more growth in mastery of the basic skills was made by pupils of the experimental group than by those of the control group. She was convinced that a difference in point of view which permeated the two types of classroom was an important factor in influencing the results of the study.

Here again, British schools of different sizes and with basically different organisations could provide valuable evidence of the scale of provision for individual differences which is practicable, and of the effects of such provision measured in terms of pupil growth.

3. Over a period of three or four years, in either the primary or the secondary school, do the relative levels of performance of children remain fairly stable?

An investigation aiming to answer this question involves either long-term growth studies or regular testing of children in sufficiently large numbers to offset differences due to such uncontrolled factors as teacher efficiency and socio-economic level. The evidence of growth studies already available, such as that of Dearborn, suggests that variability in rate of growth is an important feature of child development. Owing to the practice, widespread in the U.S.A., of not promoting pupils who have failed a grade, available evidence of the long-term performance of ability groups is only partially relevant to British conditions. Typical of such evidence, however, is the work of Coffield and Blommers whose subjects were pupils who annually took the *Iowa Basic Skills* Tests, and included some who had experienced failure once between grades two and seven. On the basis of tests given during the year of the seventh grade these researchers concluded that the variety of abilities within such a class was not effected by the rigidity or leniency of its promotion policy.

On this issue valuable evidence could result from a close study of the changes, over a period of three or four years, in the range of abilities within groups classified on entry by different criteria.

4. Does regrouping between streams lead to more rapid (or more steady) development among pupils?

Whether regrouping leads to the transfer of large numbers of pupils or only of individuals, this question involves the dynamics of group membership. It has been shown by the present writer that transfers of individual pupils between streams are followed by behaviour disorders, no doubt attributable to the emotional tensions resulting from transfer. Other findings bearing on the question of introducing individuals into pre-existing classroom groups include:

(*a*) Sandin. He found that in general, though not without exception, slow progress pupils were less favourably adjusted socially in their class groups than were their classmates; that they exhibited undesirable behaviour and attitudes; and that non-promotion of individual pupils impeded good social relations between them and the more regularly-promoted pupils.

(*b*) Goodlad. He concluded that peer group relationships were happier in regularly-promoted groups than among those whose progress was retarded. (The pattern of differences discriminated consistently neither between the groups nor between individuals).

(*c*) Buswell. He found that in general, though with exceptions, pupils who are succeeding in their school work will also be succeeding in their social relationships with their peers.

Once more research could provide further valuable information about the social and emotional relationships among pupils who are grouped on the basis of different criteria. The value of any such research would be greatly increased if it included also data on the achievement levels of the same pupils.

The questions listed in this article do not, of course, represent a total of all the issues involved in the practice of streaming. The aim has rather been to draw attention to some existing evidence relevant to certain widely-held assumptions about streaming. Such evidence is far from complete; and that reported may well run counter to the beliefs of readers. If, for either reason, this article stimulates further research in this field, the author's purpose will have been achieved.

References

1. Buswell, M. M. "The relationship between the social structure of a classroom and the academic success of pupils." *Journal of Experimental Education*, 22, 1953, 37-52.
2. Coffield, W. H., and Blommers, P. "Effects of non-promotion on educational achievement in the elementary school." *Journal of Educational Psychology*, 47, 1956, 235-50.
3. Cook, W. W. "Individual differences and curriculum practice." *Journal of Educational Psychology*. 39, 1948, 141-48.
4. Dearborn, W. F., Rothney, J. W., *et al.* *Predicting the Child's Development*. Cambridge, Massachusetts: Sci-Art Publishers, 1941.
5. Goodlad, J. I. "Some effects of promotion and non-promotion upon the social and personal adjustment of children." *Journal of Experimental Education*, 22, 1954, 301-28.
6. Jones, D. M. "An experiment in adaptation to individual differences." *Journal of Educational Psychology*, 39, 1948, 257-72.
7. Ramey, A. G. "New look at ability grouping in the junior high school." *California Journal of Secondary Education*, 31, 1956, 289-91.
8. Rudd, W. G. A. "The psychological effects of streaming by attainment, with special reference to a group of selected children." University of London M.A. Thesis, 1956.
9. Sandin, A. A. "Social and emotional adjustments of regularly promoted and non-promoted pupils." *Child Development Monograph*. *No.* 32. New York: Bureau of Publications, Teachers' College, Columbia University, 1944.
10. West, P. "A study of ability grouping in the elementary school." *Contributions to Education No.* 588. New York: Teachers' College, Columbia University, 1933.

Bibliography:

THE TEACHING OF ENGLISH IN SECONDARY SCHOOLS

SHEILA BATE, N.F.E.R.

A BIBLIOGRAPHY on such a subject is necessarily not comprehensive, since its boundaries are not definable. However, some attempt has been made to record most of the major publications generally acknowledged as important to the teaching of English in the last thirty years. It was felt that a historical perspective was necessary in a subject as liable to changes of emphasis as English in the schools has been. In addition there are some references to modern works and surveys, such as those in the field of Teaching Aids, which may be practically useful to English teachers.

Language has been emphasised rather than literature, in order to keep the list within bounds, but as it is impossible to separate the two entirely, many references to the teaching of literature are included under general headings.

Although a rough grouping has been made there is no hard and fast division between the sections.

(* = more advanced reading)

GENERAL SURVEYS

The Teaching of English in England. BOARD OF EDUCATION. H.M.S.O. 1921.

A comprehensive report which deals with English teaching at all levels. It stresses the importance of English literature in a national education.

Report of the Consultative Committee on the Education of the Adolescent (Hadow Report). H.M.S.O. 1926.

This is a generally relevant report which devotes a few pages specifically to the teaching of English. It stresses speech training and the importance of literature as an interpretation of life.

Spens Report on Secondary Education. H.M.S.O. 1938.

There are three main objectives:

(i) Communication in speech and writing.
(ii) The use of the power thus acquired to develop the child as a citizen.
(iii) A cautious statement of the importance of literature as a heritage, along with the admission that literature can perhaps not be taught.

Language: some suggestions. MINISTRY OF EDUCATION. 1954.

A general survey of native language teaching in schools, of which the introductory chapters, the chapter on composition in secondary schools and the two chapters on Language of Imagination are particularly relevant for a general perspective of the field.

The Teaching of English. I. A. GORDON. New Zealand Council for Educational Research. 1947.

This book is based partly on previous authority and partly on discussions with workers in all types of secondary school. It is liberal but not extreme. Gordon emphasises the responsibility of an English teacher in training children to write and understand clear plain prose of various types.

A Critical Survey of Objective Estimates in the Teaching of English. Dorothy Bagley *British Journal of Educational Psychology*, 1937. Parts I and II.

Part I is a report on the objective surveys and experimental research up to 1937 in the fields of reading, comprehension and the teaching of literature and appreciation. Part II contains a discussion of the best method in teaching spelling, a statement of the most common grammatical errors and a discussion of the timing in introducing grammatical ideas. She gives an account of a survey of children's composition preferences and a summary of the research in this field. There is a summary of work on the rating of compositions and a discussion of the principles of the psychology of learning as applied to English.

The Teaching of English. Incorporated Association of Assistant Masters in Secondary Schools. Cambridge University Press. 1952.

This book is the work of a committee of teachers. All aspects of English teaching are discussed, including such controversial topics as oral work, visual aids and examinations in English. Examples of VIth Form syllabuses are included, to meet the needs of both arts and science sixth forms.

Memorandum on the Teaching of English. Association of Assistant Mistresses in Secondary Schools. University of London Press. 1956.

This is a report by a working party of Grammar School teachers. It is useful particularly for its suggestions on the timing of different aspects of the subject and it contains three schemes of work for three different types of secondary school.

Teaching and Testing English. Ballard, P. B. University of London Press. 1939.

This is a sequel to Ballard's 1921 book. Amongst other things he stresses oral English. He does not think literature is capable of being taught; written work should be specific in topic and audience and should be planned. There are chapters on objective-type items in English tests.

The Language and Mental Development of Children. A. J. Watts. Harrap. 1944.

Watts deals with almost every aspect of expression, including reading, the understanding of character, metaphor and analogy and the language of feeling. He insists that education must be a leisurely process; increased linguistic power can only come about gradually through increased insight and maturity. Teachers must, therefore, have a thorough understanding of what types of activity are likely to interest children of different ages. Much more research is needed in this field. There is a useful appendix on the aims and methods of educational research and a considerable amount of test material for age levels 6-15 is attached.

English in Education. H. Blamires. G. Bles. 1951.

This is a general work in which the writer makes many cautionary observations. He warns against mixing aesthetic experience with linguistic analysis and against the too premature teaching of literary criticism. He emphasises motivation in written work.

The Teaching of English. Studies in Communication, No. 3. Contributed to the Communication Research Centre, University College, London. Edited by Randolph Quirk. Secker and Warburg. 1959.

This consists of a series of articles by different specialists on different aspects of English teaching. There are chapters on the structure of the language, style, speech education, teaching English to scientists and teaching English as a foreign language.

English in the Modern School. A. E. Smith. Methuen. 1954.

Smith emphasises speech fluency and clarity, reading for interest, and clarity as the primary aim in written work. There are many practical suggestions and useful book-lists of fiction and non-fiction works for the classes as well as many suggestions of books for teachers.

The Teaching of English in Schools. A symposium edited for the English Association by V. de Sola Pinto. Macmillan. 1946.

This very comprehensive book contains articles on the teaching of poetry, drama, choral speaking, spoken English, grammar, prose, composition, reading, examinations, the school library and teacher training.

English in Education. Supplement in the *Journal of Education.* Vol. 89. 1957.

This includes articles on English in the World Today, English in Schools, Early Steps in English, Reading and Writing in Secondary Schools, Examinations in English, Part-Time English and English as a Specialist Discipline.

Language in School. M. M. Lewis. University of London Press. 1942.

This sets out three main uses of language:

(i) As communication.
(ii) As an expression of emotion.
(iii) As a means of influencing others.

This book stresses the necessity for training children in the use of speech in everyday situations in writing for practical purposes, such as letter-writing.

THE TEACHING OF GRAMMAR

Teaching the Mother Tongue. P. B. Ballard. University of London Press. 1921.

Though old, this book is a classic on the teaching of grammar. Ballard is sceptical about the indiscriminate teaching of parsing and analysis, and suggests that more experimental research is needed before categorical decisions are made. There is much historical background to the grammar controversy: he makes a plea for rhetoric, the science of composition, to take the place of grammar in secondary schools.

The Difficulty of Grammar. W. J. Macauley. *British Journal of Educational Psychology,* Vol. XVII, Part I. 1947.

This is a study of grammar in Scottish schools. He found that few primary school pupils could get as many simple items right as wrong after four years' teaching; few junior secondary schools pupils could, and only the best of the senior secondary.

Learning and Teaching English Grammar. Hunter Diack. Chatto & Windus. 1956.

This is the teacher's book to accompany *How Words Work.* Diack attacks Macauley's conclusions and suggests that grammar should again be given a place of importance in the schools. He sees grammar as a structural process—an essential part of the process of clear thinking.

TEACHING METHODS AND THE CURRICULUM

Psychological Studies of the Curriculum and of Class-room Teaching. W. D. Wall, B.A., Ph.D. No. 7 in *Studies in Education* (London Institute of Education). 1955.

This study shows how previous research has emphasised the importance of three main groups of factors:

(i) The emotional and cognitive readiness of the child.
(ii) The social norms to which the child is to become adapted.
(iii) The environment, particularly teacher-pupil relations.

The Play Way. CALDWELL COOK. Heinemann. London. 1917.

Cook believed that the natural means of study in youth is play. He taught boys under fourteen by active methods as far as possible, since he believed that play-activities (such as debating, miming, country-dancing, etc.) which were really enjoyed resulted in learning and social adjustment.

Research and the Basic Curriculum. C. M. FLEMING. University of London Press. 1946.

This is a useful summary of research into the assumptions which have guided educational practice since the beginning of the century. There are useful analyses of the contemporary position in reading, oral expression, written expression, spelling, handwriting and the socialising of the English skills. There are many pointers for further research.

The English Subjects Synthesis. F. C. HAPPOLD. Christophers. 1951.

Happold was assistant master at Perse School in the days of Dr. Rouse. His thesis that the conventional subject divisions should be abandoned and that English, history, geography, civics, etc., should be taught in terms of skills, aesthetics, environment, heritage, etc. He lays stress on the use of projects, especially in secondary modern and technical schools.

English for the English. G. SAMPSON. Cambridge University Press. 1925.

This is an emphatic and controversial book still relevant today. Sampson stresses the importance of humanistic values in English: oral English is not given sufficient place for him. He is responsible for the words " Every teacher is a teacher of English because every teacher is a teacher in English."

English Teaching in the World Today. BRUCE PATTISON. No. 4 in *Studies in Education* (London Institute of Education).

A plea for linguistic analysis and for recognition of the importance of the structural framework in English.

The Teaching of English. BLACKPOOL EDUCATION COMMITTEE.

This consists of detailed suggestions for work programmes in English from Infant school to all types of Secondary school. Based on the principle that every teacher is a teacher of English.

An Experience Curriculum in English. Report of a Commission of the National Council of Teachers of English. Hatfield (Chairman). English Monograph, No. 4. D. Appleton-Century Co., N.Y.

A report advocating the teaching of English from kindergarten upwards in terms of experiences. These should be well-balanced, brought about by techniques taught as 'enabling' objectives, graded and adapted to the capacity of individual learners. It deals with literature, reading for different purposes, creative expression, speech and writing experiences with the aim of communication, and corrective teaching. The book consists largely of practical examples of these objectives in graded form.

***Speculative Instruments.** I. A. RICHARDS. Routledge and Kegan Paul. 1955.

This contains a chapter on the Responsibilities in the teaching of English. He criticises English teaching as planless—there is no agreement as to what should lead to what.

TEACHING AIDS

The Library in General Education. NATIONAL SOCIETY FOR THE STUDY OF EDUCATION. 42nd Year Book, Part II. The University of Chicago Press. 1943.

This book deals with all aspects of library use in schools. American school libraries have greater financial resources but many of the ideas in this book should be of use. Problems of management are discussed and a chapter on visual aids is included.

Audio-Visual Methods in Teaching. EDGAR DALE. The Dryden Press. N.Y. 1946.

This book contains a useful discussion on ' experience ' in education and the formation of concepts through experience. There is a great deal of space devoted to different sorts of audio-visual aids such as exhibits, museums, drama, film-strips, etc. One chapter is devoted specifically to the use of such aids in English, literature and reading.

English.

The journal of the English Association contains occasional lists of useful recordings of poetry and drama, with critical comments.

EXAMINATIONS IN ENGLISH

Secondary School Entrance Examinations. WATTS, PIDGEON AND YATES. N.F.E.R. Publication No. 6. Newnes.

This is a general study of the factors influencing scores in objective tests, particularly coaching and practice. There is a brief discussion of the necessity and insufficiency of objective tests in English selection. The report is based on the results of experiments done in more than fifty schools.

The Measurement of Abilities. P. E. VERNON. University of London Press. 1940.

This contains a discussion of the problems which arise in marking English compositions, a discussion of relevant abilities such as reading and reasoning abilities and a list of published tests in every field. The book is also a good introduction to basic educational statistics.

English in the G.C.E. G. G. URWIN. *The Schoolmaster*, October 9th, 1959.

A very concise and practical analysis of the different requirements of the different Examining Boards for ' O ' level English Language. Dr. Urwin, who is a Chief Examiner in Language to the London School Examinations, pays particular attention to the implications of the different lengths of the examinations.

English Language at G.C.E. , O ' Level. JAMES BRITTON in *Talks to Teachers of English.* Department of Education, King's College, Newcastle-on-Tyne. 1959.

Mr. Britton stresses the fact that special syllabus papers are available for those schools which ask for them. He concludes that examiners should concentrate on improved ways of setting and marking questions, and on testing the use of continuous language in compositions and comprehensions.

ORAL ENGLISH

The State of Spoken English in Schools. BASIL HARVEY. In *English*, Vol. XI, No. 66, Autumn 1957.

The writer is in favour of more boards following the lead of Durham and the N.U.J.M.B. and initiating ' O ' level and even ' A ' level examinations in spoken English with the aim of raising speech standards in schools.

The Teaching of Spoken English at the College of Technology, Birmingham. In *Speech and Drama*, July, 1958.

This is a discussion of the methods found to be useful in tackling the problems of communication. It should be relevant to some secondary schools.

THE WRITING AND MARKING OF ENGLISH

The Teaching of Written English. GURREY, P. Longmans. 1954.

This is a scholarly work illustrated by quotations from many authorities. Gurrey gives a detailed procedure for teaching different aspects of written English. He stresses the importance of motivation throughout the book.

The Marking of English Essays. Report of the International Examinations Enquiry. Hartog—Chairman. Macmillan & Co. 1941.

This report discusses the usefulness of various marking categories, the ambiguity of the concept of literacy, the need for training in summarising and the need for testing the self-consistency of examiners and general consistency between examiners in Public Examinations.

Free Writing. DORA PYM. University of Bristol Institute of Education, No. 10. University of London Press. 1956.

An informal account of experiments in free writing done with children aged 7-14 approx. The material used is derived from the selection examinations made for Wiltshire by the Bristol Institute. Copious examples are given. A discussion of the problems raised by these experiments by Dora Southwell.

The Film and Composition. W. F. LINDSAY. The Scottish Educational Film Association, Research Publication No. 4. 1949.

This deals with experiments done on Primary School children aged 10-12. The experiment took the form of assessing the effect of a film on composition by asking the classes to write a composition on, say, A Day in the Life of a Postman, one having seen a relevant film and the other not. A valuable appendix on the marking of English compositions is added.

Words in Action. SIR PHILIP HARTOG. University of London Press. 1947.

This is a comprehensive work on written speech discussed from many points of view, and well-illustrated with shrewd examples from Hartog's experiments in teaching. He includes sketches of the history and practice of native language teaching in several countries, and selects France's methods as worth further study.

A New Method of Marking English Compositions. R. MORRISON AND P. E. VERNON. *British Journal of Educational Psychology*, Vol. XI, Part 2. June 1941.

This is an empirical assessment of Steel and Talman's method of marking, which emphasises three features: (*a*) Vocabulary and idiom; (*b*) Sentence structure; and (*c*) Sentence linkings. The findings are that this is an unsatisfactory method because aesthetic qualities are not included. The method guarantees a reasonable assessment of grammatical qualities.

Experimental Enquiries into the Use of Essay Type English Papers. D. A. PIDGEON AND A. YATES. *British Journal of Educational Psychology*, Vol. XXVII, Part 1. 1957.

Essay-type English papers were administered to several groups of 11 year old children in an attempt to determine the reliability and validity of this type of examination. Many findings emerged, of which the most important are the evidence for idiosyncrasies and lack of consistency among children and examiners, and the conclusion that ' old type ' essay examinations are less satisfactory than objective tests in forecasting secondary school success.

***Rhetoric and English Composition.** H. J. GRIERSON. 1944.

This is an erudite work lavishly illustrated with examples from literary works. He analyses the styles and techniques of many writers. Using the phraseology of rhetoric he says much that is current in more recent works: for example he emphasises the importance of structure in English and of specific and adequate motivation in writing.

READING AND READABILITY

Vocabulary of the Secondary Modern School Child. D. G. BURNS. Occasional Publication No. 1, N.F.E.R. Newnes. 1960.

This is described as an empirical study of the words known by senior pupils in secondary modern schools. It incorporates a list of words each graded according to difficulty for boys and for girls. The level of difficulty is represented for each word by the score out of a hundred of children in their third year at twenty secondary modern schools. It provides a simple method of estimating difficulties due to vocabulary.

A New Readability Yardstick. FLESCH, R. *Journal of Applied Psychology*, 32, 221-33. 1948.

This is a revision of Flesch's early readability formula, now modified to cover sentence length and word length in one scale and personal references in another. The resultant score should give an indication of the level of difficulty of the passage. The formula is empirically derived from an analysis of reading ability of American schoolchildren.

What Do Boys and Girls Read? A. J. JENKINSON. Methuen. 1940.

This is a survey by questionnaire method of the free time reading habits of almost 3,000 children in the old senior and secondary schools. Jenkinson's thesis is that literature classes, if held at all in the middle forms, should be based in the interests of the children (school, adventure, home life stories, etc.) rather than on standards imposed by tradition.

Reading in the High School and College. NATIONAL SOCIETY FOR THE STUDY OF EDUCATION. 47th Year Book, Part II. The University of Chicago Press. 1948.

Chapters on all aspects of reading are included, each one written by an expert in the field. Among the aspects relevant to secondary schools are the scholastic and therapeutic implications of reading studies.

The Teaching of Reading and Writing. W. S. GRAY. U.N.E.S.C.O. Monographs on Fundamental Education, No. X. 1956.

This report is based on two years' work into methods of teaching reading and writing. It discusses such topics as the necessary attitudes and skills for efficient reading and the nature of reading programmes for adults, but the emphasis is on teaching reading and writing to those who are not able to do either.

The Reading Interest and Habits of Adults. W. S. GRAY AND R. MUNROE. Macmillan. N.Y. 1930.

This book consists of:

- (i) A summary of investigations amongst American children and adults showing what sort of material they read and why.
- (ii) Case studies of individuals.
- (iii) A discussion of the implications of his findings.

Reading, Film and Radio Tastes of High School Boys and Girls. W. J. SCOTT. New Zealand Council for Educational Research. 1947.

This is a survey, lasting four years, into the tastes of nearly 4,000 boys and girls. A copy of the questionnaire used is enclosed. Scott offers practical suggestions based on the result.

The Uses of Literacy. RICHARD HOGGART. A Pelican Book, first published by Chatto & Windus. 1957.

This book is an analysis of the working class way of life, with particular reference to the sort of magazines and books that working-class people are likely to read. He gives some indications of why they are not likely to take kindly to ' classic ' literature.

CRITICISM, APPRECIATION AND COMPREHENSION

***Language in Thought and Action.** S. I. HAYAKAWA. George Allen and Unwin. 1952

A stimulating book on the functions of language in social communication, in art and in the formation of attitudes and concepts. At the end of each chapter are exercises in the practical application of what has been read. Suitable for work at the sixth form level.

***Practical Criticism.** I. A. RICHARDS. Routledge and Kegan Paul. 1929.

This well-known work shows that undergraduates frequently misunderstand what they read and fail to discriminate between sterile writing and writing of high quality. The reason for this may lie in the way they are taught English.

***The Education of the Poetic Spirit.** M. L. HOURD. New Education Book Club. 1949.

A study of children's expression in the English language. This falls into four parts:

(i) Mainly empirical, concerning different kinds of dramatisation from early phantasy to senior play-readings.

(ii) Mainly concerned with the function of imagination in the written work of adolescence; a discussion of syncretic understanding is included.

(iii) A discussion of techniques and the relationship between teacher and child as it affects expression.

(iv) The writer aligns her viewpoint with other psychological theories. The nature of an aesthetic experience is discussed.

The Difficulties of Training College Students in Understanding What They Read. *British Journal of Educational Psychology*, Vol. XXIV, Part 1. 1954.

Black maintains that the results of this enquiry apply also to children between 15-18. His conclusions are based on answers to objective tests. He finds eight main sources of error comprising failure to understand writer's attitude, irony, words which for one reason or another may be difficult, difficult allusions, non-comprehension of the nature of metaphor, lack of background information, failure to note the influence of the context, and preconceptions on the part of the reader.

Thinking to Some Purpose. S. STEBBING. First published 1939. Reprinted as a Pelican Book, 1959.

Clear Thinking. R. W. JEPSON. Longmans. 1954.

Straight and Crooked Thinking. R. H. THOULESS. First published 1930. Revised and enlarged, 1953. Pan Books Ltd.

These books are concerned with logical thinking and with tricks and fallacies in thinking processes. They demonstrate such things as the influence of emotive words, reliance on ' authority ' and the use of ambiguous terms.

A new publication:

SPELLING IRREGULARITY AND READING DIFFICULTY IN ENGLISH

by W. R. Lee, M.A., Dr. Phil.,
Institute of Education, University of London

N.F.E.R. Occasional Publication, No. 2

English spelling is frequently looked upon as an important cause of reading difficulty. If spelling were reformed, children would make better progress with their reading, and fewer children would be unable to read for pleasure by the time they left school. This is the view of the Simplified Spelling Society, at whose suggestion this study was undertaken. It is published as No. 2 in the series of Occasional Publications prepared by the N.F.E.R.

This series is intended to make available to research workers and others, specialised matter arising from research work undertaken in this country by the N.F.E.R. itself, by individual research workers, by officers attached to L.E.A.'s or by the research departments of Universities. Material which would normally find its place in one or other of the learned journals will not be published, nor will matter which could be expected to achieve publication in book form. The series is intended to provide an outlet for work of a high level but with a limited readership and which would otherwise become rapidly inaccessible.

Obtainable direct from

The National Foundation for Educational Research,

79, WIMPOLE STREET, LONDON, W.1

74 pp., 18 tables, price 10/-. Postage and Packing 9d. in U.K.

N.B.—Please send cash with order

© *National Foundation for Educational Research in England and Wales.*

Printed by King, Thorne & Stace Limited, 1-13 Jubilee Street, Brighton, 1,
and published by Newnes Educational Publishing Co., Ltd., Tower House, Southampton Street, Strand, London, W.C.2.,
for The National Foundation for Educational Research in England and Wales, 79 Wimpole Street, London, W.1.